ATOMIC ENERGY LEVELS

As Derived From the Analyses of Optical Spectra

Volume I, Section 1

The Spectra of Hydrogen, Deuterium, Helium, Lithium Beryllium, Boron, Carbon, Nitrogen, Oxygen, and Fluorine

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The Spectra of Hydrogen, Deuterium, Helium, Lithium
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By CHARLOTTE E. MOORE

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Foreword

This pamphlet is the first of a series being prepared at the National Bureau of Standards as part of a program on the critical compilation of all energy levels derived from observations of atomic spectra (exclusive of hyperfine structure ascribed to atomic nuclei). The collected results will finally appear in bound volumes of approximately 500 pages each, made up of these sections.

The project was undertaken after the authors of "Atomic Energy States", R. F. Bacher and S. Goudsmit, stated that they had no intention of revising their extremely useful book published in 1932. That book gave data for 231 spectra, most of which were incompletely described and analyzed 15 years ago. Now structure has been recognized in 460 spectra, and the former analysis in almost every case has been greatly extended. The purpose of these pamphlets is to make all present information available to scientific workers.

Details of the work were discussed at a meeting of the National Research Council Committee on Line Spectra of the Elements called by the chairman, H. N. Russell, and held in Washington in May 1946. It was then decided to send to interested workers in various fields a questionnaire regarding the most useful form of presentation of the data on atomic energy levels. The present form represents the majority vote resulting from that inquiry.

A text describing details of the tables will form the introduction to volume I. It will also contain numerous indices and cross references to facilitate the use of the books. In addition, charts of predicted terms in the spectra of leading isoelectronic sequences will be given.

Even without the detailed introduction, it is hoped that the advance distribution of the individual sections as they are completed may stimulate further spectroscopic research.

The generous response with unpublished material and the many helpful conferences with scientific workers are a great inspiration in carrying out this extensive task. The cordial cooperation and personal interest of the numerous scientists who have been participating in this project are greatly appreciated. In particular, the many suggestions by W. F. Meggers have been invaluable.

E. U. Condon, *Director*.

Washington, D. C., January 1948.

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HYDROGEN

H I

1 electron $\qquad$ $\boldsymbol{Z=1}$

Ground state $1s\ ^2S_{\frac{1}{2}}$

$1s\ ^2S_{\frac{1}{2}}$ 109679.041 cm^{-1} $\qquad$ **I. P. 13.595 volts**

The term values through $n=38$ have been calculated by J. E. Mack, using $R_{H_1}=109677.581$ and taking into account the fine structure of the individual lines. Mack's calculations have been extended to include $n=39$ and $n=40$. Details of the spectrum are given by Fowler and by Paschen-Götze. The wavelengths calculated by J. E. Mack have been published in the Revised Multiplet Table.

W. E. Lamb, Jr. and R. C. Retherford have recently been studying "The Fine Structure of the Hydrogen Atom by a Microwave Method", and have kindly furnished their preliminary results in advance of publication. They state that the $2s\ ^2S_{\frac{1}{2}}$ level is higher than the $2p\ ^2P^{\circ}_{\frac{1}{2}}$ level by about 0.033 cm^{-1} and that this value almost certainly lies between 0.027 cm^{-1} and 0.043 cm^{-1}.

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H I

Config.	Desig.	J	Level	Interval
1*s*	1*s* ^{2}S	½	0.000	
2*s*, 2*p* 2*p*	2*s* ^{2}S, 2*p* ^{2}P° 2*p* ^{2}P°	½ 1½	82259.190 82259.555	0.365
3*s*, 3*p* 3*p*, 3*d* 3*d*	3*s* ^{2}S, 3*p* ^{2}P° 3*p* ^{2}P°, 3*d* ^{2}D 3*d* ^{2}D	½ 1½ 2½	97492.481 97492.589 97492.625	0.108 0.036
4*s* to 4*f*	4*s* ^{2}S to 4*f* ^{2}F°	½ to 3½	102824.118 to .186	0.068
5*s* to 5*g*	5*s* ^{2}S to 5*g* ^{2}G	½ to 4½	105291.898 to .936	0.038
6*s* to 6*h*	6*s* ^{2}S to 6*h* ^{2}H°	½ to 5½	106632.418 to .441	0.023
7*s*, etc.	7*s* ^{2}S, etc.	½, etc.	107440.708 to .722	0.014
8*s*, etc.	8*s* ^{2}S, etc.	½, etc.	107965.319 to .329	0.010
9*s*, etc.	9*s* ^{2}S, etc.	½, etc.	108324.990 to .997	0.007
10*s*, etc.	10*s* ^{2}S, etc.	½, etc.	108582.26	
11*s*, etc.	11*s* ^{2}S, etc.	½, etc.	108772.61	
12*s*, etc.	12*s* ^{2}S, etc.	½, etc.	108917.39	
13*s*, etc.	13*s* ^{2}S, etc.	½, etc.	109030.06	
14*s*, etc.	14*s* ^{2}S, etc.	½, etc.	109119.46	
15*s*, etc.	15*s* ^{2}S, etc.	½, etc.	109191.58	
16*s*, etc.	16*s* ^{2}S, etc.	½, etc.	109250.61	
17*s*, etc.	17*s* ^{2}S, etc.	½, etc.	109299.53	
18*s*, etc.	18*s* ^{2}S, etc.	½, etc.	109340.53	

H I

Config.	Desig.	J	Level	Interval
19*s*, etc.	19*s* ^{2}S, etc.	½, etc.	109375.22	
20*s*, etc.	20*s* ^{2}S, etc.	½, etc.	109404.85	
21*s*, etc.	21*s* ^{2}S, etc.	½, etc.	109430.34	
22*s*, etc.	22*s* ^{2}S, etc.	½, etc.	109452.43	
23*s*, etc.	23*s* ^{2}S, etc.	½, etc.	109471.711	
24*s*, etc.	24*s* ^{2}S, etc.	½, etc.	109488.629	
25*s*, etc.	25*s* ^{2}S, etc.	½, etc.	109503.557	
26*s*, etc.	26*s* ^{2}S, etc.	½, etc.	109516.796	
27*s*, etc.	27*s* ^{2}S, etc.	½, etc.	109528.592	
28*s*, etc.	28*s* ^{2}S, etc.	½, etc.	109539.146	
29*s*, etc.	29*s* ^{2}S, etc.	½, etc.	109548.628	
30*s*, etc.	30*s* ^{2}S, etc.	½, etc.	109557.177	
31*s*, etc.	31*s* ^{2}S, etc.	½, etc.	109564.912	
32*s*, etc.	32*s* ^{2}S, etc.	½, etc.	109571.934	
33*s*, etc.	33*s* ^{2}S, etc.	½, etc.	109578.327	
34*s*, etc.	34*s* ^{2}S, etc.	½, etc.	109584.164	
35*s*, etc.	35*s* ^{2}S, etc.	½, etc.	109589.508	
36*s*, etc.	36*s* ^{2}S, etc.	½, etc.	109594.413	
37*s*, etc.	37*s* ^{2}S, etc.	½, etc.	109598.926	
38*s*, etc.	38*s* ^{2}S, etc.	½, etc.	109603.087	
39*s*, etc.	39*s* ^{2}S, etc.	½, etc.	109606.932	
40*s*, etc.	40*s* ^{2}S, etc.	½, etc.	109610.493	
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	∞=*Limit*	------------	**109679.041**	

April 1946.

DEUTERIUM

D

1 electron $Z=1$

Ground state $1s\ ^2S_{1/2}$

$1s\ ^2S_{1/2}$ 109708.879 cm^{-1} I. P. 13.598 volts

The term values have been calculated by J. E. Mack, using R_D=109707.419 and taking into account the fine structure of the individual lines. The wavelengths calculated by J. E. Mack have been published in the Revised Multiplet Table.

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W. F. Meggers, J. Opt. Soc. Am. **36**, 431 (1946). (Summary hfs)

D

Config.	Desig.	J	Level	Interval
1s	$1s\ ^2S$	½	0.000	
2s, 2p	$2s\ ^2S$, $2p\ ^2P°$	½	82281.568	0.365
2p	$2p\ ^2P°$	1½	82281.933	
3s, 3p	$3s\ ^2S$, $3p\ ^2P°$	½	97519.004	0.108
3p, 3d	$3p\ ^2P°$, $3d\ ^2D$	1½	97519.112	0.036
3d	$3d\ ^2D$	2½	97519.148	
4s to 4f	$4s\ ^2S$ to $4f\ ^2F°$	½ to 3½	102852.091 to .159	0.068
5s to 5g	$5s\ ^2S$ to $5g\ ^2G$	½ to 4½	105320.542 to .580	0.038

D

Config.	Desig.	J	Level	Interval
6s to 6h	$6s\ ^2S$ to $6h\ ^2H°$	½ to 5½	106661.427 to .450	0.023
7s, etc.	$7s\ ^2S$, etc.	½, etc.	107469.937 to .951	0.014
8s, etc.	$8s\ ^2S$, etc.	½, etc.	107994.691 to .701	0.010
	∞=*Limit*		**109708.879**	

April 1946.

HELIUM

He I

2 electrons **$Z=2$**

Ground state $1s^2\ ^1S_0$

$1s^2\ ^1S_0$ 198305±15 cm^{-1} **I. P. 24.580 volts**

Most of the terms are taken from Paschen-Götze with the term values subtracted from Paschen's limit as quoted by Robinson in 1937. Higher members of the $^1F^\circ$ and $^3F^\circ$ series are taken from Meggers and Dieke. The term $2p\ ^3P^\circ$ has been calculated from its combination with $2s\ ^3S_1$, using the resolved triplet as observed by Meggers, the intervals being -0.078 cm^{-1} and -0.996 cm^{-1}. The components of $3p\ ^3P^\circ$ are based on Paschen's value of $3p\ ^3P^\circ_2$ and the intervals observed by Gibbs and Kruger; -0.165 cm^{-1} and -0.192 cm^{-1}.

Some doubt exists regarding the correct classifications of lines attributed to doubly excited helium, such as those observed at 309.04 A and 320.38 A by Compton and Boyce, and at 320.392 A and 357.507 A by Kruger. Approximate theoretical computations of the energies of doubly excited levels have been made by a number of authors and are summarized by Wu. His classification of the line observed at 320.4 A as $2p\ ^3P^\circ - 2p^2\ ^3P$ has been adopted and used for the calculation of $2p^2\ ^3P$.

Several references deal with intercombinations in He I, namely, those by Lyman, Hopfield, Paschen, Suga, and others. The term values based on the excellent long series have been adopted in the table, since it is believed that they are the most accurate.

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He I

Config.	Desig.	J	Level
$1s^2$	$1s^2\ ^1S$	0	0 ± 15
$1s\,2s$	$2s\ ^3S$	1	159850.318
$1s\,2s$	$2s\ ^1S$	0	166271.70
$1s\,2p$	$2p\ ^3P^o$	2 1 0	*169081.111* *169081.189* *169082.185*
$1s\,2p$	$2p\ ^1P^o$	1	*171129.148*
$1s\,3s$	$3s\ ^3S$	1	183231.08
$1s\,3s$	$3s\ ^1S$	0	184859.06
$1s\,3p$	$3p\ ^3P^o$	2 1 0	*185558.92* *185559.085* *185559.277*
$1s\,3d$	$3d\ ^3D$	3, 2, 1	186095.90
$1s\,3d$	$3d\ ^1D$	2	186099.22
$1s\,3p$	$3p\ ^1P^o$	1	*186203.62*
$1s\,4s$	$4s\ ^3S$	1	190292.46
$1s\,4s$	$4s\ ^1S$	0	190934.50
$1s\,4p$	$4p\ ^3P^o$	2, 1, 0	*191211.42*
$1s\,4d$	$4d\ ^3D$	3, 2, 1	191438.83
$1s\,4d$	$4d\ ^1D$	2	191440.71
$1s\,4f$	$4f\ ^3F^o$	4, 3, 2	*191446.61*
$1s\,4f$	$4f\ ^1F^o$	3	*191447.24*
$1s\,4p$	$4p\ ^1P^o$	1	*191486.95*
$1s\,5s$	$5s\ ^3S$	1	193341.33
$1s\,5s$	$5s\ ^1S$	0	193657.78
$1s\,5p$	$5p\ ^3P^o$	2, 1, 0	*193795.07*
$1s\,5d$	$5d\ ^3D$	3, 2, 1	193911.48
$1s\,5d$	$5d\ ^1D$	2	193912.54
$1s\,5f$	$5f\ ^1F^o$	3	*193914.31*
$1s\,5f$	$5f\ ^3F^o$	4, 3, 2	*193915.79*
$1s\,5p$	$5p\ ^1P^o$	1	*193936.75*
$1s\,6s$	$6s\ ^3S$	1	194930.46
$1s\,6s$	$6s\ ^1S$	0	195109.17
$1s\,6p$	$6p\ ^3P^o$	2, 1, 0	*195187.21*
$1s\,6d$	$6d\ ^3D$	3, 2, 1	195254.37
$1s\,6d$	$6d\ ^1D$	2	195255.02
$1s\,6f$	$6f\ ^1F^o$	3	*195256.7*
$1s\,6f$	$6f\ ^3F^o$	4, 3, 2	*195256.82*
$1s\,6p$	$6p\ ^1P^o$	1	*195269.17*
$1s\,7s$	$7s\ ^3S$	1	195862.63
$1s\,7s$	$7s\ ^1S$	0	195973.19
$1s\,7p$	$7p\ ^3P^o$	2, 1, 0	*196021.72*
$1s\,7d$	$7d\ ^3D$	3, 2, 1	196064.00
$1s\,7d$	$7d\ ^1D$	2	196064.31
$1s\,7f$	$7f\ ^1F^o$	3	*196065.4*
$1s\,7f$	$7f\ ^3F^o$	4, 3, 2	*196065.51*
$1s\,7p$	$7p\ ^1P^o$	1	*196073.41*
$1s\,8s$	$8s\ ^3S$	1	196455.79
$1s\,8s$	$8s\ ^1S$	0	196529.03
$1s\,8p$	$8p\ ^3P^o$	2, 1, 0	*196561.08*
$1s\,8d$	$8d\ ^3D$	3, 2, 1	196589.42
$1s\,8d$	$8d\ ^1D$	2	196589.73
$1s\,8f$	$8f\ ^1F^o$	3	*196590.3*
$1s\,8f$	$8f\ ^3F^o$	4, 3, 2	*196590.42*
$1s\,8p$	$8p\ ^1P^o$	1	*196595.56*
$1s\,9s$	$9s\ ^3S$	1	196856.37
$1s\,9s$	$9s\ ^1S$	0	196907.13
$1s\,9p$	$9p\ ^3P^o$	2, 1, 0	*196929.68*
$1s\,9d$	$9d\ ^1D$	2	196949.49
$1s\,9d$	$9d\ ^3D$	3, 2, 1	196949.63
$1s\,9f$	$9f\ ^1F^o$	3	*196950.3*
$1s\,9f$	$9f\ ^3F^o$	4, 3, 2	*196950.36*
$1s\,9p$	$9p\ ^1P^o$	1	*196953.95*
$1s\,10s$	$10s\ ^3S$	1	197139.76
$1s\,10s$	$10s\ ^1S$	0	197176.36
$1s\,10p$	$10p\ ^3P^o$	2, 1, 0	*197192.63*
$1s\,10d$	$10d\ ^1D$	2	197207.08
$1s\,10d$	$10d\ ^3D$	3, 2, 1	197207.30
$1s\,10f$	$10f\ ^3F^o$	4, 3, 2	*197208.0*
$1s\,10p$	$10p\ ^1P^o$	1	*197210.41*
$1s\,11s$	$11s\ ^3S$	1	197347.05
$1s\,11p$	$11p\ ^3P^o$	2, 1, 0	*197386.98*
$1s\,11d$	$11d\ ^1D$	2	197397.62
$1s\,11d$	$11d\ ^3D$	3, 2, 1	197397.75
$1s\,11f$	$11f\ ^3F^o$	4, 3, 2	*197398.6*
$1s\,11p$	$11p\ ^1P^o$	1	*197400.18*
$1s\,12s$	$12s\ ^3S$	1	197503.69
$1s\,12s$	$12s\ ^1S$	0	197524.26

He I—Continued

Config.	Desig.	J	Level
1s 12p	$12p\ ^3P^\circ$	2, 1, 0	*197534. 44*
1s 12d	$12d\ ^1D$	2	197542. 54
1s 12d	$12d\ ^3D$	3, 2, 1	197542. 67
1s 12p	$12p\ ^1P^\circ$	1	*197544. 56*
1s 13s	$13s\ ^3S$	1	197624. 98
1s 13p	$13p\ ^3P^\circ$	2, 1, 0	*197649. 07*
1s 13s	$13s\ ^1S$	0	197649. 78
1s 13d	$13d\ ^1D$	2	197655. 19
1s 13d	$13d\ ^3D$	3, 2, 1	197655. 47
1s 13p	$13p\ ^1P^\circ$	1	*197656. 95*
1s 14s	$14s\ ^3S$	1	197721. 13
1s 14p	$14p\ ^3P^\circ$	2, 1, 0	*197739. 90*
1s 14d	$14d\ ^1D$	2	197744. 918
1s 14d	$14d\ ^3D$	3, 2, 1	197744. 94
1s 14p	$14p\ ^1P^\circ$	1	*197746. 15*
1s 15s	$15s\ ^3S$	1	197796. 63
1s 15p	$15p\ ^3P^\circ$	2, 1, 0	*197813. 11*
1s 15d	$15d\ ^3D$	3, 2, 1	197817. 05
1s 15p	$15p\ ^1P^\circ$	1	*197818. 12*
1s 16p	$16p\ ^3P^\circ$	2, 1, 0	*197872. 95*
1s 16d	$16d\ ^3D$	3, 2, 1	197876. 41
1s 16p	$16p\ ^1P^\circ$	1	*197877. 04*
1s 17p	$17p\ ^3P^\circ$	2, 1, 0	*197922. 51*
1s 17d	$17d\ ^3D$	3, 2, 1	197925. 33
1s 17p	$17p\ ^1P^\circ$	1	*197925. 87*
1s 18p	$18p\ ^3P^\circ$	2, 1, 0	*197964. 02*
1s 18d	$18d\ ^3D$	3, 2, 1	197966. 75
1s 18p	$18p\ ^1P^\circ$	1	*197966. 80*
1s 19p	$19p\ ^3P^\circ$	2, 1, 0	*197999. 12*
1s 19d	$19d\ ^3D$	3, 2, 1	198001. 43
1s 19p	$19p\ ^1P^\circ$	1	*198001. 44*
1s 20p	$20p\ ^3P^\circ$	2, 1, 0	*198029. 07*
1s 20p	$20p\ ^1P^\circ$	1	*198031. 02*
1s 20d	$20d\ ^3D$	3, 2, 1	198031. 41
1s 21p	$21p\ ^3P^\circ$	2, 1, 0	*198054. 83*
1s 21d	$21d\ ^3D$	3, 2, 1	198056. 50
1s 22p	$22p\ ^3P^\circ$	2, 1, 0	*198077. 15*
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He II ($^2S_{1/2}$)	*Limit*	----------	**198305**
$2p^2$	$2p^2\ ^3P$	2, 1, 0	481198

August 1946.

He II

(H I sequence; 1 electron) $Z=2$

Ground state $1s\ ^2S_{\frac{1}{2}}$

$1s\ ^2S_{\frac{1}{2}}$ **438912.425** cm^{-1} I. P. 54.403 volts

The term values have been calculated by J. E. Mack, using $R_{He}=109722.263$ and taking into account the fine structure of the individual lines. Details of the spectrum are given by Fowler and by Paschen-Götze. The wavelengths calculated by J. E. Mack have been published in the Revised Multiplet Table.

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He II

Config.	Desig.	J	Level	Interval
1s	1s ^{2}S	½	0.000	
2s, 2p	2s ^{2}S, 2p ^{2}P°	½	329182.858	5.843
2p	2p ^{2}P°	1½	329188.701	
3s, 3p	3s ^{2}S, 3p ^{2}P°	½	390144.376	1.733
3p, 3d	3p ^{2}P°, 3d ^{2}D	1½	390146.109	0.576
3d	3d ^{2}D	2½	390146.685	
4s, 4p	4s ^{2}S, 4p ^{2}P°	½	411480.673	0.729
4p, 4d	4p ^{2}P°, 4d ^{2}D	1½	411481.402	0.242
4d, 4f	4d ^{2}D, 4f ^{2}F°	2½	411481.644	0.122
4f	4f ^{2}F°	3½	411481.766	
5s, 5p	5s ^{2}S, 5p ^{2}P°	½	421356.227	0.374
5p, 5d	5p ^{2}P°, 5d ^{2}D	1½	421356.601	0.122
5d, 5f	5d ^{2}D, 5f ^{2}F°	2½	421356.723	0.065
5f, 5g	5f ^{2}F°, 5g ^{2}G	3½	421356.788	0.038
5g	5g ^{2}G	4½	421356.826	
6s to 6h	6s ^{2}S to 6h ^{2}H°	½ to 5½	426720.683 to 1.043	0.360
7s, etc.	7s ^{2}S, etc.	½, etc.	429955.263 to .496	0.233
8s, etc.	8s ^{2}S, etc.	½, etc.	432054.618 to .778	0.160
9s, etc.	9s ^{2}S, etc.	½, etc.	433493.924 to 4.039	0.115
10s, etc.	10s ^{2}S, etc.	½, etc.	434523.448 to .532	0.084
11s, etc.	11s ^{2}S, etc.	½, etc.	435285.179 to .241	0.062
12s, etc.	12s ^{2}S, etc.	½, etc.	435864.534 to .583	0.049
13s, etc.	13s ^{2}S, etc.	½, etc.	436315.409 to .447	0.038
14s, etc.	14s ^{2}S, etc.	½, etc.	436673.163 to .194	0.031
15s, etc.	15s ^{2}S, etc.	½, etc.	436961.781 to .807	0.026
16s, etc.	16s ^{2}S, etc.	½, etc.	437197.994 to 8.015	0.021
17s, etc.	17s ^{2}S, etc.	½, etc.	437393.761 to .778	0.017
18s, etc.	18s ^{2}S, etc.	½, etc.	437557.815 to .829	0.014
19s, etc.	19s ^{2}S, etc.	½, etc.	437696.654 to .666	0.012
20s, etc.	20s ^{2}S, etc.	½, etc.	437815.191 to .202	0.011
21s, etc.	21s ^{2}S, etc.	½, etc.	437917.202 to .212	0.010
22s, etc.	22s ^{2}S, etc.	½, etc.	438005.620 to .629	0.009
	Limit		438912.425	

April 1946.

LITHIUM

Li I

3 electrons $Z=3$

Ground state $1s^2\ 2s\ ^2S_{\frac{1}{2}}$

$2s\ ^2S_{\frac{1}{2}}$ **43486.76** $\pm$**0.28** cm^{-1} I. P. 5.390 volts

The analysis is from Fowler and Paschen-Götze. Meissner has generously furnished in advance of publication preliminary results of level splittings derived from observed hyperfine-structure of selected lines. These data are as follows:

Term	Interval (cm^{-1})	Line resolved (A)	Term	Line resolved (A)
$2p\ ^2P^\circ$	0. 3366 ±0. 0005*	6707. 912, . 761	$3s\ ^2S$	8126. 452, . 231
$3d\ ^2D$	0. 037 ±0. 001	6103. 649, . 538	$4s\ ^2S$	4971. 745, . 661
$4d\ ^2D$	0. 017 ±0. 002	4602. 894, . 826	$5s\ ^2S$	4273. 127, . 066
$5d\ ^2D$	0. 010 ±0. 002	4132. 191, . 136	$6s\ ^2S$	3985. 538, . 485
$6d\ ^2D$	0. 008 ±0. 003	3915. 346, . 295		

*Average of 6 determinations.

The values in the table for the above terms have been calculated from these wavelengths. Jackson and Kuhn state that the multiplet splitting of $2p\ ^2P^\circ=0.3372 \pm 0.0005$ cm^{-1}.

The remaining terms given to two decimals have been calculated from the measures by France. All other term values are from Fowler's Report.

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Li I

Config.	Desig.	J	Level
$2s$	$2s\ ^2S$	½	0.00
$2p$	$2p\ ^2P^\circ$	½ 1½	*14903.66* *14904.00*
$3s$	$3s\ ^2S$	½	27206.12
$3p$	$3p\ ^2P^\circ$	½, 1½	*30925.38*
$3d$	$3d\ ^2D$	1½ 2½	31283.08 31283.12
$4s$	$4s\ ^2S$	½	35012.06
$4p$	$4p\ ^2P^\circ$	½, 1½	*36469.55*
$4d$	$4d\ ^2D$	1½ 2½	36623.38 36623.40
$4f$	$4f\ ^2F^\circ$	2½, 3½	*36630.2*
$5s$	$5s\ ^2S$	½	38299.50
$5p$	$5p\ ^2P^\circ$	½, 1½	*39015.56*
$5d$	$5d\ ^2D$	1½ 2½	39097.42 39097.44
$5f$	$5f\ ^2F^\circ$	2½, 3½	*39104.5*
$6s$	$6s\ ^2S$	½	39987.64
$6p$	$6p\ ^2P^\circ$	½, 1½	*40390.84*
$6d$	$6d\ ^2D$	1½ 2½	40437.31 40437.32
$7s$	$7s\ ^2S$	½	40950.7
$7p$	$7p\ ^2P^\circ$	½, 1½	*41217.35*
$7d$	$7d\ ^2D$	1½, 2½	41248.9
$8p$	$8p\ ^2P^\circ$	½, 1½	*41751.63*
$8d$	$8d\ ^2D$	1½, 2½	41787.3
$9p$	$9p\ ^2P^\circ$	½, 1½	*42118.27*
$9d$	$9d\ ^2D$	1½, 2½	42141.1
$10p$	$10p\ ^2P^\circ$	½, 1½	*42379.16*
$11p$	$11p\ ^2P^\circ$	½, 1½	*42569.1*
$12p$	$12p\ ^2P^\circ$	½, 1½	*42719.14*
$13p$	$13p\ ^2P^\circ$	½, 1½	*42832.92*
$14p$	$14p\ ^2P^\circ$	½, 1½	*42923.39*
$15p$	$15p\ ^2P^\circ$	½, 1½	*42995.51*
$16p$	$16p\ ^2P^\circ$	½, 1½	*43055.34*
$17p$	$17p\ ^2P^\circ$	½, 1½	*43105.42*
$18p$	$18p\ ^2P^\circ$	½, 1½	*43146.96*
$19p$	$19p\ ^2P^\circ$	½, 1½	*43181.84*
$20p$	$20p\ ^2P^\circ$	½, 1½	*43211.39*
$21p$	$21p\ ^2P^\circ$	½, 1½	*43237.16*
$22p$	$22p\ ^2P^\circ$	½, 1½	*43259.14*
$23p$	$23p\ ^2P^\circ$	½, 1½	*43278.96*
$24p$	$24p\ ^2P^\circ$	½, 1½	*43296.03*
$25p$	$25p\ ^2P^\circ$	½, 1½	*43311.45*
$26p$	$26p\ ^2P^\circ$	½, 1½	*43324.81*
$27p$	$27p\ ^2P^\circ$	½, 1½	*43336.40*
$28p$	$28p\ ^2P^\circ$	½, 1½	*43346.39*
$29p$	$29p\ ^2P^\circ$	½, 1½	*43354.91*
$30p$	$30p\ ^2P^\circ$	½, 1½	*43363.71*
$31p$	$31p\ ^2P^\circ$	½, 1½	*43372.06*
$32p$	$32p\ ^2P^\circ$	½, 1½	*43378.31*
$33p$	$33p\ ^2P^\circ$	½, 1½	*43384.9*
$34p$	$34p\ ^2P^\circ$	½, 1½	*43390.3*
$35p$	$35p\ ^2P^\circ$	½, 1½	*43395.4*
$36p$	$36p\ ^2P^\circ$	½, 1½	*43400.5*
$37p$	$37p\ ^2P^\circ$	½, 1½	*43404.7*
$38p$	$38p\ ^2P^\circ$	½, 1½	*43408.6*
$39p$	$39p\ ^2P^\circ$	½, 1½	*43412.4*
$40p$	$40p\ ^2P^\circ$	½, 1½	*43416.9*
$41p$	$41p\ ^2P^\circ$	½, 1½	*43420.9*
$42p$	$42p\ ^2P^\circ$	½, 1½	*43424.3*
Li II ($^1S_0$)	*Limit*	------------	43486.76

December 1947.

Li II

(He I sequence; 2 electrons) $Z=3$

Ground state $1s^2\ ^1S_0$

$1s^2\ ^1S_0$ **610079±25** cm^{-1} I. P. 75.6193±0.0031 volts

Singlet series have been published by both Schüler and Werner, the longer ones by Schüler. In the term list Schüler's rounded off values have been used for the terms $4s$ to $7s\ ^1S$, $5d$ to $8d\ ^1D$ and $8f\ ^1F^{\circ}$. The limit is from Robinson and the $2p$ to $4p\ ^1P^{\circ}$ terms are from Edlén. All the remaining terms are from Werner, who gives also an extrapolated value of $2s\ ^1S_0$, entered in brackets in the table.

Intersystem combinations have not been observed, but the long series should give a reliable determination of the relative positions of the singlet and triplet terms.

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Li II

Author	Config.	Desig.	J	Level
$1s^2\ ^1S$	$1s^2$	$1s^2\ ^1S$	0	0
$2s$	$1s\ 2s$	$2s\ ^3S$	1	476046
$2s$	$1s\ 2s$	$2s\ ^1S$	0	[490079]
$2p$	$1s\ 2p$	$2p\ ^3P^{\circ}$	2, 1, 0	*494273*
$1s\ 2p\ ^1P$	$1s\ 2p$	$2p\ ^1P^{\circ}$	1	*501816*
$3s$	$1s\ 3s$	$3s\ ^3S$	1	554761
3S	$1s\ 3s$	$3s\ ^1S$	0	558779
$3p$	$1s\ 3p$	$3p\ ^3P^{\circ}$	2, 1, 0	*559601*
$3d$	$1s\ 3d$	$3d\ ^3D$	3, 2, 1	561245
3D	$1s\ 3d$	$3d\ ^1D$	2	561276
$1s\ 3p\ ^1P$	$1s\ 3p$	$3p\ ^1P^{\circ}$	1	*561749*
$4s$	$1s\ 4s$	$4s\ ^3S$	1	579982
4S	$1s\ 4s$	$4s\ ^1S$	0	581590
$4p$	$1s\ 4p$	$4p\ ^3P^{\circ}$	2, 1, 0	*581897*
$4d$	$1s\ 4d$	$4d\ ^3D$	3, 2, 1	582612
4D	$1s\ 4d$	$4d\ ^1D$	2	582631
$4f$	$1s\ 4f$	$4f\ ^3F^{\circ}$	4, 3, 2	*582644*
4F	$1s\ 4f$	$4f\ ^1F^{\circ}$	3	*582645*
$1s\ 4p\ ^1P$	$1s\ 4p$	$4p\ ^1P^{\circ}$	1	*582832*
$5s$	$1s\ 5s$	$5s\ ^3S$	1	591184
5S	$1s\ 5s$	$5s\ ^1S$	0	591984
$5p$	$1s\ 5p$	$5p\ ^3P^{\circ}$	2, 1, 0	*592141*
$5d$	$1s\ 5d$	$5d\ ^3D$	3, 2, 1	592505
5D	$1s\ 5d$	$5d\ ^1D$	2	592508

Li II—Continued

Author	Config.	Desig.	J	Level
5F	$1s\,5f$	$5f\ ^{1}F^{\circ}$	3	*592523*
$5f$	$1s\,5f$	$5f\ ^{3}F^{\circ}$	4, 3, 2	*592527*
5P	$1s\,5p$	$5p\ ^{1}P^{\circ}$	1	*592639*
$6s$	$1s\,6s$	$6s\ ^{3}S$	1	597122
6S	$1s\,6s$	$6s\ ^{1}S$	0	597574
$6p$	$1s\,6p$	$6p\ ^{3}P^{\circ}$	2, 1, 0	*597666*
$6d$	$1s\,6d$	$6d\ ^{3}D$	3, 2, 1	597876
6D	$1s\,6d$	$6d\ ^{1}D$	2	597877
$6f$	$1s\,6f$	$6f\ ^{3}F^{\circ}$	4, 3, 2	*597886*
6F	$1s\,6f$	$6f\ ^{1}F^{\circ}$	3	*597886*
$7s$	$1s\,7s$	$7s\ ^{3}S$	1	600641
7S	$1s\,7s$	$7s\ ^{1}S$	0	600925
$7d$	$1s\,7d$	$7d\ ^{3}D$	3, 2, 1	601115
7D	$1s\,7d$	$7d\ ^{1}D$	2	601115
$7f$	$1s\,7f$	$7f\ ^{3}F^{\circ}$	4, 3, 2	*601121*
7F	$1s\,7f$	$7f\ ^{1}F^{\circ}$	3	*601122*
8D	$1s\,8d$	$8d\ ^{1}D$	2	603214
$8f$	$1s\,8f$	$8f\ ^{3}F^{\circ}$	4, 3, 2	*603221*
8F	$1s\,8f$	$8f\ ^{1}F^{\circ}$	3	*603221*
	Li III ($^{2}S_{1/2}$)	*Limit*		610079

May 1946.

Li III

(H I sequence; 1 electron) $Z=3$

Ground state $1s\ ^{2}S_{1/2}$

$1s\ ^{2}S_{1/2}$ 987677 cm^{-1} I. P. 122.423 volts

Edlén has calculated from the Penney series formula the positions of the first three lines of the Lyman series, $1s\ ^{2}S-np\ ^{2}P^{\circ}$ ($n=2, 3, 4$), at 134.994 A, 113.903 A, and 107.997 A, respectively. These lines are clearly visible on his spectrograms, but there is a discordance between the observed and calculated wavelengths, which he attributes to the unsymmetrical broadening of the lines.

Gale and Hoag report that they have observed 5 lines of this series and the first line of the Balmer series. The calculated position of the latter is 729.05 A, according to Edlén.

The term values listed have been derived from Edlén's calculated wavelengths.

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B. Edlén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **9**, No. 6, 28, 152 (1934). (I P) (T) (C L)

Li III

Config.	Desig.	J	Level
$1s$	$1s\ ^{2}S$	½	0
$2p$	$2p\ ^{2}P^{\circ}$	½, 1½	*740774*
$3p$	$3p\ ^{2}P^{\circ}$	½, 1½	*877940*
$4p$	$4p\ ^{2}P^{\circ}$	½, 1½	*925952*
	Limit		987677

October 1946.

BERYLLIUM

Be I

4 electrons $Z=4$

Ground state $1s^2\,2s^2\;{}^1S_0$

$2s^2\;{}^1S_0$ **75192.29 cm^{-1}** I. P. 9.320 volts

All but four of the terms are from the work of Paschen or Paschen and Kruger. According to Paschen no intersystem combinations have been observed. The relative positions of the singlet and triplet terms are, however, excellently determined by long series with a relative uncertainty x not exceeding ± 2 cm^{-1}.

The predicted position of the resonance line, $2s^2\;{}^1S_0 - 2p\;{}^3P^\circ_1$, is 4548.29 A. Paton and Nusbaum have observed a line at 4553.07 A to which they assign this classification, but their result has not been confirmed.

The term values of higher series members, calculated from the series formula but not substantiated by observation, are in brackets in the table.

Four terms are from Edlén's work: $2p^2\;{}^1D$, $3p\;{}^3P^\circ$, $2p^2\;{}^1S$, and $3p\;{}^3P$.

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W. F. Meggers, J. Opt. Soc. Am. **36**, 431 (1946). (Summary hfs)

Be I

Config.	Desig.	J	Level	Interval
$2s^2$	$2s^2\;{}^1S$	0	0.00	
$2s(^2S)2p$	$2p\;{}^3P^\circ$	0	*21979.43*+x	
				0.68
		1	*21980.11*+x	
				2.35
		2	*21982.46*+x	
$2s(^2S)2p$	$2p\;{}^1P^\circ$	1	*42565.3*	
$2s(^2S)3s$	$3s\;{}^3S$	1	52082.07+x	
$2s(^2S)3s$	$3s\;{}^1S$	0	54677.2	
$2p^2$	$2p^2\;{}^1D$	2	56432.5	
$2s(^2S)3p$	$3p\;{}^3P^\circ$	0, 1, 2	*58791.6* +x	
$2p^2$	$2p^2\;{}^3P$	0	59694.61+x	
				1.40
		1	59696.01+x	
				2.03
		2	59698.04+x	

Be I

Config.	Desig.	J	Level	Interval
$2s(^2S)3p$	$3p\;{}^1P^\circ$	1	[*60187*]	
$2s(^2S)3d$	$3d\;{}^3D$	1, 2, 3	62054.8 +x	
$2s(^2S)3d$	$3d\;{}^1D$	2	64428.15	
$2s(^2S)4s$	$4s\;{}^3S$	1	64507.7 +x	
$2s(^2S)4s$	$4s\;{}^1S$	0	65245.4	
$2s(^2S)4p$	$4p\;{}^3P^\circ$	0, 1, 2	[*65949*] +x	
$2s(^2S)4p$	$4p\;{}^1P^\circ$	1	[*67228*]	
$2s(^2S)4d$	$4d\;{}^3D$	1, 2, 3	67943.6 +x	
$2s(^2S)4d$	$4d\;{}^1D$	2	68781.2	
$2s(^2S)5s$	$5s\;{}^3S$	1	69009.3 +x	

Be I—Continued

Config.	Desig.	J	Level	Interval
$2s\,(^2S)\,5s$	$5s\ ^1S$	0	69322.3	
$2s\,(^2S)\,5p$	$5p\ ^3P^\circ$	0, 1, 2	[69634.5] $+x$	
$2s\,(^2S)\,5d$	$5d\ ^3D$	1, 2, 3	70606.7 $+x$	
$2s\,(^2S)\,5d$	$5d\ ^1D$	2	71002.3	
$2s\,(^2S)\,6s$	$6s\ ^3S$	1	71161.9 $+x$	
$2s\,(^2S)\,6s$	$6s\ ^1S$	0	71320.7	
$2s\,(^2S)\,6p$	$6p\ ^3P^\circ$	0, 1, 2	[71482.9] $+x$	
$2p^2$	$2p^2\ ^1S$	0	71498.9	
$2s\,(^2S)\,6d$	$6d\ ^3D$	1, 2, 3	72030.6 $+x$	
$2s\,(^2S)\,6d$	$6d\ ^1D$	2	72251.1	
$2s\,(^2S)\,7s$	$7s\ ^3S$	1	72355.4 $+x$	
$2s\,(^2S)\,7s$	$7s\ ^1S$	0	72448.3	
$2s\,(^2S)\,7d$	$7d\ ^3D$	1, 2, 3	72881.9 $+x$	
$2s\,(^2S)\,7d$	$7d\ ^1D$	2	73017.2	
$2s\,(^2S)\,8s$	$8s\ ^3S$	1	73089.1 $+x$	
$2s\,(^2S)\,8s$	$8s\ ^1S$	0	73146.7	
$2s\,(^2S)\,8d$	$8d\ ^3D$	1, 2, 3	73429.6 $+x$	
$2s\,(^2S)\,8d$	$8d\ ^1D$	2	73519.7	
$2s\,(^2S)\,9s$	$9s\ ^1S$	0	73608.5	

Be I—Continued

Config.	Desig.	J	Level	Interval
$2s\,(^2S)\,9d$	$9d\ ^3D$	1, 2, 3	73803.2 $+x$	
$2s\,(^2S)\,9d$	$9d\ ^1D$	2	73866.9	
$2s\,(^2S)\,10s$	$10s\ ^1S$	0	73930.4	
$2s\,(^2S)\,10d$	$10d\ ^3D$	1, 2, 3	74070.6 $+x$	
$2s\,(^2S)\,10d$	$10d\ ^1D$	2	74116.7	
$2s\,(^2S)\,11s$	$11s\ ^1S$	0	74163.4	
$2s\,(^2S)\,11d$	$11d\ ^3D$	1, 2, 3	74268.6	
$2s\,(^2S)\,11d$	$11d\ ^1D$	2	74301.4	
$2s\,(^2S)\,12d$	$12d\ ^3D$	1, 2, 3	74416.3 $+x$	
$2s\,(^2S)\,12d$	$12d\ ^1D$	2	74443.2	
Be II $(^2S_{1/2})$	*Limit*	---------	75192.29	
$2p\,(^2P^\circ)\,3s$	$3s\ ^3P^\circ$	0	85554.96 $+x$	
		1	85557.01 $+x$	2.05
		2	85560.93 $+x$	3.92
$2p\,(^2P^\circ)\,3p$	$3p\ ^3P$	0		
		1		
		2	91901.8 $+x$	
$2p\,(^2P^\circ)\,3d$	$3d\ ^3D^\circ$	1	[94189.51] $+x$	
		2	94190.11 $+x$	0.60
		3	94191.26 $+x$	1.15
$2p\,(^2P^\circ)\,3d$	$3d\ ^3P^\circ$	0	95162.1 $+x$	
		1	95163.1 $+x$	1.0
		2	95165.0 $+x$	1.9

May 1946.

Be I Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2$	$2s^2\ ^1S$		
$2s(^2S)2p$	$\{2p\ ^3P^\circ$, $2p\ ^1P^\circ$		
$2p^2$	$\{2p^2\ ^1S$, $2p^2\ ^3P$, $2p^2\ ^1D$		
	$ns\ (n \geq 3)$	$np\ (n \geq 3)$	$nd\ (n \geq 3)$
$2s(^2S)nx$	$\{3\text{–}8s\ ^3S$, $3\text{–}11s\ ^1S$	$3p\ ^3P^\circ$	$3\text{–}12d\ ^3D$, $3\text{–}12d\ ^1D$
$2p(^2P^\circ)nx$	$3s\ ^3P^\circ$	$3p\ ^3P$	$3d\ ^3P^\circ$ $3d\ ^3D^\circ$

*For predicted terms in the spectra of the Be I isoelectronic sequence, see Introduction.

Be II

(Li I sequence; 3 electrons) **Z=4**

Ground state $1s^2\,2s\;^2S_{½}$

$2s\;^2S_{½}$ 146881.7 cm^{-1} **I. P. 18.206 volts**

The analysis has been taken from the paper by Paschen and Kruger.

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H. E. White, *Introduction to Atomic Spectra* p. 98, (McGraw-Hill Book Co., Inc. New York, N. Y., 1934). (G D)
W. F. Meggers, J. Opt. Soc. Am. **36**, 431 (1946). (Summary hfs)

Be II

Config.	Desig.	J	Level	Interval
2s	$2s\;^2S$	½	0.0	
2p	$2p\;^2P^\circ$	½ 1½	*31928.8* *31935.4*	6.6
3s	$3s\;^2S$	½	88231.2	
3p	$3p\;^2P^\circ$	½ 1½	*96496.4* *96498.2*	1.8
3d	$3d\;^2D$	1½, 2½	98053.2	
4s	$4s\;^2S$	½	115465.2	
4p	$4p\;^2P^\circ$	½ 1½	*118760*	
4d	$4d\;^2D$	1½, 2½	119422.2	
4f	$4f\;^2F^\circ$	2½, 3½	*119444.6*	
5s	$5s\;^2S$	½	127336.1	
5p	$5p\;^2P^\circ$	½ 1½	*128970.2*	
5d	$5d\;^2D$	1½, 2½	129311.3	
5f	$5f\;^2F^\circ$	2½, 3½	*129321.9*	
6s	$6s\;^2S$	½	133559.1	
6p	$6p\;^2P^\circ$	½ 1½	*134485.6*	
6d	$6d\;^2D$	1½, 2½	134682.0	
6f	$6f\;^2F^\circ$	2½, 3½	*134688.1*	
7s	$7s\;^2S$	½	137226.0	
7p	$7p\;^2P^\circ$	½ 1½	*137796*	
7d	$7d\;^2D$	1½, 2½	137920.0	
7f	$7f\;^2F^\circ$	2½, 3½	*137923.1*	
8d	$8d\;^2D$	1½, 2½	140020.4	
Be III ($^1S_0$)	*Limit*	---------	146881.7	

April 1946.

Be III

(He I sequence; 2 electrons) Z=4

Ground state $1s^2\;^1S_0$

$1s^2\;^1S_0$ 1241225 ±100 cm^{-1} I. P. 153.850 ±0.012 volts

Both Robinson and Edlén report six lines of the singlet series observed, although the earlier members have also been measured by others. The range is between 81 A and 100 A. The singlet terms have been taken from Robinson's paper.

The relative absolute values of the triplet and singlet terms have been determined by extrapolation of $3d\;^3D$ from He I and Li II, according to Edlén, who has generously furnished his unpublished term values of the triplets. Apparently no intersystem combinations have been observed in Be III, but the existence of the observed line $1s^2\;^1S_0-2p\;^3P_1^\circ$ in the related spectra from B IV to Al XII, within the errors of measurement of the predicted positions, indicates that the uncertainty x is small.

Be III—Continued

REFERENCES

B. Edlén, Nova Acta Reg. Soc. Sci. Uppsala [IV] 9, No. 6, 31 (1934). (T) (C L)
H. A. Robinson, Phys. Rev. 51, 14 (1937). (I P) (T) (C L)
B. Edlén, unpublished material (Sept. 1947). (T)

Be III | **Be III**

Config.	Desig.	J	Level	Interval	Config.	Desig.	J	Level	Interval
$1s^2$	$1s^2\ ^1S$	0	0		$1s\ 4p$	$4p\ ^1P^\circ$	1	*1179830*	
$1s\ 2s$	$2s\ ^3S$	1	$956496+x$		$1s\ 5p$	$5p\ ^1P^\circ$	1	*1201894*	
$1s\ 2p$	$2p\ ^3P^\circ$	0			$1s\ 6p$	$6p\ ^1P^\circ$	1	*1213931*	
		1	$983348+x$	15	$1s\ 7p$	$7p\ ^1P^\circ$	1	*1221135*	
		2	$983363+x$						
$1s\ 2p$	$2p\ ^1P^\circ$	1	*997466*						
$1s\ 3p$	$3p\ ^1P^\circ$	1	*1132323*		Be IV ($^2S_{1/2}$)	*Limit*		**1241225**	

September 1947.

Be IV

(H I sequence; 1 electron) $Z=4$

Ground state $1s\ ^2S_{1/2}$

$1s\ ^2S_{1/2}$ 1756065 cm^{-1} I. P. 217.664 volts

For the lines of Be IV that have been observed, $1s\,^2S-np\,^2P^\circ$ ($n=2$ to 7), Robinson lists wavelengths derived from the Penney series formula. The range is from 58 A to 75 A. The terms listed for this spectrum have been calculated from his data.

Tyrén also reports the first three members of the series as observed.

REFERENCES

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B. Edlén, Nova Acta Reg. Soc. Sci. Uppsala [IV] 9, No. 6, 28, 152 (1934). (I P) (T) (C L)
H. A. Robinson, Phys. Rev. 50, 99 (1936). (C L)
F. Tyrén, Zeit. Phys. 98, 771 (1936). (C L)

Be IV | **Be IV**

Config.	Desig.	J	Level	Config.	Desig.	J	Level
$1s$	$1s\ ^2S$	½	0	$6p$	$6p\ ^2P^\circ$	½, 1½	*1707292*
$2p$	$2p\ ^2P^\circ$	½, 1½	*1317087*	$7p$	$7p\ ^2P^\circ$	½, 1½	*1720235*
$3p$	$3p\ ^2P^\circ$	½, 1½	*1560966*				
$4p$	$4p\ ^2P^\circ$	½, 1½	*1646324*		*Limit*		**1756065**
$5p$	$5p\ ^2P^\circ$	½, 1½	*1685832*				

October 1946.

BORON

B I

5 electrons $Z=5$

Ground state $1s^2\ 2s^2\ 2p\ ^2P^\circ_{\frac{1}{2}}$

$2p\ ^2P^\circ$ **66930** cm^{-1} I. P. 8.296 volts

The spectrum is incompletely observed, but 34 lines have been classified in the interval between 1378 A and 2498 A. The terms for which there is an entry in the column of the table headed "Authors", are from Edlén, but a correction of 90 cm^{-1} has been added to the limit as quoted from Selwyn (66840 cm^{-1}). Whitelaw and Mack have recalculated the limit and derived the value B I $2s^2\ 2p\ ^2P^\circ_{\frac{1}{2}}$—B II $2s^2\ ^1S_0=66930$ cm^{-1}, using the ^2D series alone because of extra-configurational perturbations in the ^2S series. Selwyn averaged the limits from both the ^2S and ^2D series.

The remaining terms are from an unpublished manuscript kindly furnished by Clearman, who has extended the doublet series by further observations and confirmed the correction to the limit mentioned above. Clearman has also found two quartet terms. No intersystem combinations have been observed, as indicated by x in the table. Edlén estimates that $2p\,^2P^\circ_{1\frac{1}{2}}-2p^2\,^4P_{2\frac{1}{2}}=28800$ cm^{-1}, by analogy with the observed intersystem combinations in C II and N III. The corresponding value of $2p^2\ ^4P_{\frac{1}{2}}$ is entered in brackets in the table and has been added to all of Clearman's values of quartet terms.

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B. Edlén, Zeit. Phys. **98**, 564 (1936). (C L)
W. Opeschowski and D. A. DeVries, Physica **6**, No. 9, 913 (1939). (I S)
W. F. Meggers, J. Opt. Soc. Am. **36**, 431 (1946). (Summary hfs)
H. E. Clearman Jr., unpublished material (Aug. 1947). (T) (C L)

B I

Authors	Config.	Desig.	J	Level	Interval
$2p\ ^2P_1$ $^2P_2$	$2s^2(^1S)2p$	$2p\ ^2P^\circ$	½ 1½	*0* *16*	16
	$2s\ 2p^2$	$2p^2\ ^4P$	½ 1½ 2½	[28805]+x 28810 +x 28816 +x	5 6
$2p'\ ^4P_2$					
$3s\ ^2S_1$	$2s^2(^1S)3s$	$3s\ ^2S$	½	40040	
$2p'\ ^2D$	$2s\ 2p^2$	$2p^2\ ^2D$	{1½ 2½}	47857	
$3d\ ^2D$	$2s^2(^1S)3d$	$3d\ ^2D$	{1½ 2½}	54765	
$4s\ ^2S_1$	$2s^2(^1S)4s$	$4s\ ^2S$	½	55009	
$4d\ ^2D$	$2s^2(^1S)4d$	$4d\ ^2D$	{1½ 2½}	59989	
$5s\ ^2S_1$	$2s^2(^1S)5s$	$5s\ ^2S$	½	60146	
	$2s^2(^1S)6s$	$6s\ ^2S$	½	62098	

B I

Authors	Config.	Desig.	J	Level	Interval
$5d\ ^2D$	$2s^2(^1S)5d$	$5d\ ^2D$	{1½ 2½}	62481	
	$2s\ 2p^2$	$2p^2\ ^2S$	½	63561	
$6d\ ^2D$	$2s^2(^1S)6d$	$6d\ ^2D$	{1½ 2½}	63847	
	$2s^2(^1S)7s$	$7s\ ^2S$	½	64156	
	$2s^2(^1S)7d$	$7d\ ^2D$	{1½ 2½}	64664	
	$2s^2(^1S)8d$	$8d\ ^2D$	{1½ 2½}	65195	
	$2s^2(^1S)9s$	$9s\ ^2S$	½	65553	
	B II ($^1S_0$)	*Limit*	------	***66930***	
	$2s\ 2p^2$	$2p^2\ ^2P$	½ 1½	72535 72547	12
	$2p^3$	$2p^3\ ^4S^\circ$	1½	*97037+x*	

August 1947.

B I OBSERVED TERMS*

Config. $1s^2+$	Observed Terms	
$2s^2(^1S)2p$	$2p\ ^2P^\circ$	
$2s\ 2p^2$	{ $2p^2\ ^4P$; $2p^2\ ^2S$ $2p^2\ ^2P$ $2p^2\ ^2D$	
$2p^3$	$2p^3\ ^4S^\circ$	
	ns ($n\geq 3$)	nd ($n\geq 3$)
$2s^2(^1S)nx$	3–7s, 9s ^2S	3–8d ^2D

*For predicted terms in the spectra of the B I isoelectronic sequence, see Introduction.

B II

(Be I sequence; 4 electrons) $Z=5$

Ground state $1s^2\ 2s^2\ ^1S_0$

$2s^2\ ^1S_0$ 202895 cm^{-1} I. P. 25.149 volts

The terms are from Edlén, who remarks that the observed series, especially in the singlet system, are too short for the precise determination of the limits. By analogy with Be I, C III, and N IV, he interpolates the value of $2s^2\ ^1S_0-2p\ ^3P^\circ_1$ as 37340 cm^{-1}, which places the limit $2s^2\ ^1S_0$ at 202895.0 cm^{-1}. The absolute values of the singlet terms as published in Edlén's Monograph have therefore been increased by 249 cm^{-1}. The relative uncertainty x is probably less than this. No intersystem combinations have been observed.

An extrapolated value of $3s\ ^1S_0$ is given in brackets.

B II—Continued

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B. Edlén, Nova Acta Reg. Soc. Sci. Uppsala [IV] 9, No. 6, 51 (1934). (T) (C L)
B. Edlén, Zeit. Phys. 98, 561 (1936). (I P) (C L)

Edlén	Config.	Desig.	J	Level	Interval	Edlén	Config.	Desig.	J	Level	Interval
$2s\ ^1S_0$	$2s^2$	$2s^2\ ^1S$	0	0.0		$4p\ ^3P$	$2s(^2S)4p$	$4p\ ^3P^\circ$	0, 1, 2	*171544.7+x*	
$2p\ ^3P_0$ $^3P_1$ $^3P_2$	$2s(^2S)2p$	$2p\ ^3P^\circ$	0 1 2	*37333.6+x* *37340.0+x* *37356.4+x*	6.4 16.4	$4d\ ^3D$	$2s(^2S)4d$	$4d\ ^3D$	1, 2, 3	174072.6+x	
						$4f\ ^3F$	$2s(^2S)4f$	$4f\ ^3F^\circ$	2, 3, 4	*174902.5+x*	
$2p\ ^1P_1$	$2s(^2S)2p$	$2p\ ^1P^\circ$	1	*73396.7*		$4f\ ^1F_3$	$2s(^2S)4f$	$4f\ ^1F^\circ$	3	*174921.5*	
$2p'\ ^3P_0$ $^3P_1$ $^3P_2$	$2p^2$	$2p^2\ ^3P$	0 1 2	98910.3+x 98918.7+x 98932.7+x	8.4 14.0	$4d\ ^1D_2$	$2s(^2S)4d$	$4d\ ^1D$	2	175546.0	
						$5s\ ^3S_1$	$2s(^2S)5s$	$5s\ ^3S$	1	180896.5+x	
$2p'\ ^1D_2$	$2p^2$	$2p^2\ ^1D$	2	102362.1		$3s'\ ^3P_0$ $^3P_1$ $^3P_2$	$2p(^2P^\circ)3s$	$3s\ ^3P^\circ$	0 1 2	*181645.2+x* *181655.0+x* *181675.9+x*	9.8 20.9
$2p'\ ^1S_0$	$2p^2$	$2p^2\ ^1S$	0	127662.0							
$3s\ ^3S_1$	$2s(^2S)3s$	$3s\ ^3S$	1	129772.9+x		$5d\ ^3D$	$2s(^2S)5d$	$5d\ ^3D$	1, 2, 3	184633.1+x	
$3s\ ^1S_0$	$2s(^2S)3s$	$3s\ ^1S$	0	[135946]		$5f\ ^3F$	$2s(^2S)5f$	$5f\ ^3F^\circ$	2, 3, 4	*184908.2+x*	
$3p\ ^3P_{01}$ $^3P_2$	$2s(^2S)3p$	$3p\ ^3P^\circ$	0, 1 2	*143989.7+x* *143993.4+x*	3.7	$3p'\ ^1P_1$	$2p(^2P^\circ)3p$	$3p\ ^1P$	1	189126.6	
						$3d'\ ^3F_{23}$ $^3F_4$	$2p(^2P^\circ)3d$	$3d\ ^3F^\circ$	2, 3 4	*194748? +x* *194760? +x*	12
$3p\ ^1P_1$	$2s(^2S)3p$	$3p\ ^1P^\circ$	1	*144102.0*							
$3d\ ^3D$	$2s(^2S)3d$	$3d\ ^3D$	1, 2, 3	150649.0+x		$3d'\ ^1D_2$	$2p(^2P^\circ)3d$	$3d\ ^1D^\circ$	2	*197721.0*	
$3d\ ^1D_2$	$2s(^2S)3d$	$3d\ ^1D$	2	154686.9		$3d'\ ^3D$	$2p(^2P^\circ)3d$	$3d\ ^3D^\circ$	1, 2, 3	*200484.6+x*	
$4s\ ^3S_1$	$2s(^2S)4s$	$4s\ ^3S$	1	166344.4+x							
$4s\ ^1S_0$	$2s(^2S)4s$	$4s\ ^1S$	0	167934.2			B III ($^2S_{½}$)	*Limit*	------	202895	

May 1946.

B II Observed Terms*

<table>
<tr><th>Config.
$1s^2+$</th><th colspan="4">Observed Terms</th></tr>
<tr><td>$2s^2$</td><td colspan="4">$2s^2\ ^1S$</td></tr>
<tr><td>$2s(^2S)2p$</td><td colspan="4">$2p\ ^3P^\circ$
$2p\ ^1P^\circ$</td></tr>
<tr><td>$2p^2$</td><td colspan="4">$2p^2\ ^3P$
$2p^2\ ^1S$ $2p^2\ ^1D$</td></tr>
<tr><td></td><td>ns ($n\geq3$)</td><td>np ($n\geq3$)</td><td>nd ($n\geq3$)</td><td>nf ($n\geq4$)</td></tr>
<tr><td>$2s(^2S)nx$</td><td>3–5$s\ ^3S$
4$s\ ^1S$</td><td>3, 4$p\ ^3P^\circ$
3$p\ ^1P^\circ$</td><td>3–5$d\ ^3D$
3, 4$d\ ^1D$</td><td>4, 5$f\ ^3F^\circ$
4$f\ ^1F^\circ$</td></tr>
<tr><td>$2p(^2P^\circ)nx$</td><td>$3s\ ^3P^\circ$</td><td>$3p\ ^1P$</td><td>$3d\ ^3D^\circ$ $3d\ ^3F^\circ$
$3d\ ^1D^\circ$</td><td></td></tr>
</table>

*For predicted terms in the spectra of the Be I isoelectronic sequence, see Introduction.

B III

(Li I sequence; 3 electrons) **$Z=5$**

Ground state $1s^2\,2s\ ^2S_{1/2}$

$2s\ ^2S_{1/2}$ **305931.1 cm^{-1}** I. P. 37.920 volts

The terms are from Edlén. The absolute values are based on the assumption that n^* for $5g\ ^2G$ equals that of the corresponding term in C IV, where $5g\ ^2G-6h\ ^2H°$ has been observed. The precision of this term in B III is estimated to be within ± 1 cm^{-1}. The series are well represented by a Ritz formula.

Edlén gives four extrapolated term intervals, which are entered in brackets in the table

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B. Edlén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **9**, No. 6, 37 (1934). (I P) (T) (C L) (G D)

B III

Edlén	Config.	Desig.	J	Level	Interval
$2s\ ^2S_1$	$2s$	$2s\ ^2S$	½	0.0	
$2p\ ^2P_1$	$2p$	$2p\ ^2P°$	½	*48358.5*	34.1
$^2P_2$			1½	*48392.6*	
$3s\ ^2S_1$	$3s$	$3s\ ^2S$	½	180201.8	
$3p\ ^2P_1$	$3p$	$3p\ ^2P°$	½	*192949.2*	10.2
$^2P_2$			1½	*192959.4*	
$3d\ ^2D_3$	$3d$	$3d\ ^2D$	1½ 2½	196071.2	[3.4]
$4s\ ^2S_1$	$4s$	$4s\ ^2S$	½	237695.5	
$4p\ ^2P_3$	$4p$	$4p\ ^2P°$	½ 1½	*242832.4*	[4.3]
$4d\ ^2D_3$	$4d$	$4d\ ^2D$	1½ 2½	244138.9	[1.4]
$4f\ ^2F$	$4f$	$4f\ ^2F°$	{2½ 3½}	*244199.2*	
$5s\ ^2S_1$	$5s$	$5s\ ^2S$	½	263156.2	

B III

Edlén	Config.	Desig.	J	Level	Interval
$5p\ ^2P_3$	$5p$	$5p\ ^2P°$	½ 1½	*265719.7*	[2.2]
$5d\ ^2D_3$	$5d$	$5d\ ^2D$	1½ 2½	266389.5	
$5f\ ^2F$	$5f$	$5f\ ^2F°$	{2½ 3½}	*266416.5*	
$5g\ ^2G$	$5g$	$5g\ ^2G$	{3½ 4½}	266427.2	
$6d\ ^2D_3$	$6d$	$6d\ ^2D$	1½ 2½	278473.7	
$6f\ ^2F$	$6f$	$6f\ ^2F°$	{2½ 3½}	*278491.7*	
$6g\ ^2G$	$6g$	$6g\ ^2G$	{3½ 4½}	278497.5	
	B IV ($^1S_0$)	*Limit*	------	**305931.1**	

April 1946.

B IV

(He I sequence; 2 electrons) **$Z=5$**

Ground state $1s^2\ ^1S_0$

$1s^2\ ^1S_0$ **2091960 ± 200** cm^{-1} I. P. 259.298 ± 0.025 volts

The singlet terms are from Tyrén and the observed singlet combinations are in the range from 48 to 60 A. The unit adopted by Tyrén, 10^3 cm^{-1}, has here been changed to cm^{-1}.

Relative absolute values of the triplet terms were derived by the extrapolation of $3d\ ^3D$ from He I and Li II, according to unpublished material generously furnished by Dr. Edlén. These calculations have confirmed the classification by Tyrén of a line at 61 A as the intersystem combination $1s^2\ ^1S_0-2p\ ^3P_1^{\circ}$. The triplet terms have been taken from Edlén's 1947 manuscript.

B IV—Continued

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B IV

Config.	Desig.	*J*	Level	Interval
$1s^2$	$1s^2\ ^1S$	0	0	
$1s\ 2s$	$2s\ ^3S$	1	1601505	
$1s\ 2p$	$2p\ ^3P^\circ$	0 1 2	*1636898* *1636882* *1636934*	−16 52
$1s\ 2p$	$2p\ ^1P^\circ$	1	*1658020*	
$1s\ 3p$	$3p\ ^1P^\circ$	1	*1898180*	

B IV

Config.	Desig.	*J*	Level	Interval
$1s\ 4p$	$4p\ ^1P^\circ$	1	*1982750*	
$1s\ 5p$	$5p\ ^1P^\circ$	1	*2022000*	
$1s\ 6p$	$6p\ ^1P^\circ$	1	*2043360*	
B V ($^2S_{½}$)	*Limit*		2091960	

September 1947.

B V

(H I sequence; 1 electron) $Z=5$

Ground state $1s\ ^2S_{½}$

$1s\ ^2S_{½}$ 2744207 cm^{-1} I. P. 340.144 volts

Edlén has calculated the positions of the first three members of the Lyman series, $1s\ ^2S-np\ ^2P^\circ$ ($n=2$, 3, 4), using Penney's formula. These wavelengths, 48.585 A, 40.995 A and 38.869 A, respectively, have been used to compute the term values listed here. The lines have all been observed by Tyrén.

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B V

Config.	Desig.	*J*	Level
$1s$	$1s\ ^2S$	½	0
$2p$	$2p\ ^2P^\circ$	½, 1½	*2058247*
$3p$	$3p\ ^2P^\circ$	½, 1½	*2439322*

B V

Config.	Desig.	*J*	Level
$4p$	$4p\ ^2P^\circ$	½, 1½	*2572744*
	Limit		2744207

October 1946.

CARBON

C I

6 electrons $Z=6$

Ground state $1s^2\ 2s^2\ 2p^2\ {}^3P_0$

$2p^2\ {}^3P_0$ **90878.3** cm^{-1} I. P. 11.264 volts

The term assignments are taken from Edlén, who has revised and extended the earlier work on the analysis of this spectrum. Two extrapolated term values, derived from the irregular doublet law, are entered in brackets in the table.

The singlet and triplet terms are well connected by intersystem combinations. Only two quintet terms are known. They are connected with the rest by intersystem combinations based on the measures of the resonance lines by Shenstone.

One term, $5p\ {}^1S$, has been revised as suggested in the 1939 reference listed below.

Selected term values of C I have been improved from a study of the lines that have been clearly identified in the Infrared Solar Spectrum. Such precision cannot be expected from terms based on lines in the ultraviolet. As a starting point the value of $3s\ {}^3P^\circ_1=60353.00$ cm^{-1} was adopted as correct, to agree with Shenstone's recent measures. Excellent agreement was found between the laboratory measures of Kiess (8335 A to 11330 A) and solar wave-numbers of lines identified as C I in the solar spectrum. Further to the red solar wavelengths surpass laboratory values in accuracy and give consistent internal separations within the multiplets.

In the course of this work all term values have been recalculated. Consequently, most of the listed values differ slightly from those published by Edlén. No changes have been made in his analysis, but the level $3d\ {}^3P^\circ_0$, calculated from solar wave-numbers, has been added to his list.

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A. G. Shenstone, Phys. Rev. **72**, 411 (1947). (T) (C L)

C I

Edlén	Config.	Desig.	J	Level	Interval
$2p\,^3P_0$	$2s^2\,2p^2$	$2p^2\,^3P$	0	0.0	16.4
$^3P_1$			1	16.4	27.1
$^3P_2$			2	43.5	
$2p\,^1D_2$	$2s^2\,2p^2$	$2p^2\,^1D$	2	10193.70	
$2p^1\,S_0$	$2s^2\,2p^2$	$2p^2\,^1S$	0	21648.4	
	$2s\,2p^3$	$2p^3\,^5S^\circ$	2	*33735.2*	
$3s\,^3P_0$	$2s^2\,2p(^2P^\circ)3s$	$3s\,^3P^\circ$	0	*60333.80*	19.20
$^3P_1$			1	*60353.00*	40.52
$^3P_2$			2	*60393.52*	
$3s\,^1P_1$	$2s^2\,2p(^2P^\circ)3s$	$3s\,^1P^\circ$	1	*61982.20*	
$2p'\,^3D_3$	$2s\,2p^3$	$2p^3\,^3D^\circ$	3	*64088.56*	−4.63
$^3D_2$			2	*64093.19*	1.18
$^3D_1$			1	*64092.01*	
$3p\,^1P_1$	$2s^2\,2p(^2P^\circ)3p$	$3p\,^1P$	1	68858	
$3p\,^3D_1$	$2s^2\,2p(^2P^\circ)3p$	$3p\,^3D$	1	69689.79	21.20
$^3D_2$			2	69710.99	33.41
$^3D_3$			3	69744.40	
$3p\,^3S_1$	$2s^2\,2p(^2P^\circ)3p$	$3p\,^3S$	1	70744.26	
$3p\,^3P_0$	$2s^2\,2p(^2P^\circ)3p$	$3p\,^3P$	0	71352.81	12.42
$^3P_1$			1	71365.23	20.47
$^3P_2$			2	71385.70	
$3p\,^1D_2$	$2s^2\,2p(^2P^\circ)3p$	$3p\,^1D$	2	72611.06	
$3p\,^1S_0$	$2s^2\,2p(^2P^\circ)3p$	$3p\,^1S$	0	73976.23	
$2p'\,^3P$	$2s\,2p^3$	$2p^3\,^3P^\circ$	2, 1, 0	*75256.3*	
$3d\,^1D_2$	$2s^2\,2p(^2P^\circ)3d$	$3d\,^1D^\circ$	2	*77680.5*	
$4s\,^3P_0$	$2s^2\,2p(^2P^\circ)4s$	$4s\,^3P^\circ$	0	*78105.23*	11.83
$^3P_1$			1	*78117.06*	31.30
$^3P_2$			2	*78148.36*	
$3d\,^3F_2$	$2s^2\,2p(^2P^\circ)3d$	$3d\,^3F^\circ$	2	*78199.34*	16.48
$^3F_3$			3	*78215.82*	34.40
$^3F_4$			4	*78250.22*	
$3d\,^3D_1$	$2s^2\,2p(^2P^\circ)3d$	$3d\,^3D^\circ$	1	*78300.8*	6
$^3D_2$			2	*78307*	9
$^3D_3$			3	*78316*	
$4s\,^1P_1$	$2s^2\,2p(^2P^\circ)4s$	$4s\,^1P^\circ$	1	*78338*	
$3d\,^1F_3$	$2s^2\,2p(^2P^\circ)3d$	$3d\,^1F^\circ$	3	*78531*	
$3d\,^1P_1$	$2s^2\,2p(^2P^\circ)3d$	$3d\,^1P^\circ$	1	*78727.91*	
$3d\,^3P_2$	$2s^2\,2p(^2P^\circ)3d$	$3d\,^3P^\circ$	2	*79311.10*	−7.96
$^3P_1$			1	*79319.06*	−4.26
			0	*79323.32*	
$4p\,^3D_1$	$2s^2\,2p(^2P^\circ)4p$	$4p\,^3D$	1	80173.29	19.20
$^3D_2$			2	80192.49	30.25
$^3D_3$			3	80222.74	
$4p\,^1P_1$	$2s^2\,2p(^2P^\circ)4p$	$4p\,^1P$	1	80563.57	
$4p\,^3S_1$	$2s^2\,2p(^2P^\circ)4p$	$4p\,^3S$	1	81105.70	
$4p\,^3P_0$	$2s^2\,2p(^2P^\circ)4p$	$4p\,^3P$	0	81311.52	14.81
$^3P_1$			1	81326.33	18.15
$^3P_2$			2	81344.48	
$4p\,^1D_2$	$2s^2\,2p(^2P^\circ)4p$	$4p\,^1D$	2	81770.36	
$4p\,^1S_0$	$2s^2\,2p(^2P^\circ)4p$	$4p\,^1S$	0	82252.31	

C I

Edlén	Config.	Desig.	J	Level	Interval
$4d\,^1D_2$	$2s^2\,2p(^2P^\circ)4d$	$4d\,^1D^\circ$	2	*83500*	
	$2s^2\,2p(^2P^\circ)4d$	$4d\,^3F^\circ$	2		
$4d\,^3F_3$			3	*83761*	
			4		
$4d\,^3D_1$	$2s^2\,2p(^2P^\circ)4d$	$4d\,^3D^\circ$	1	*83830*	7
$^3D_2$			2	*83837*	10
$^3D_3$			3	*83847*	
$5s\,^1P_1$	$2s^2\,2p(^2P^\circ)5s$	$5s\,^1P^\circ$	1	*83882.5*	
$4d\,^1F_3$	$2s^2\,2p(^2P^\circ)4d$	$4d\,^1F^\circ$	3	*83949*	
$4d\,^1P_1$	$2s^2\,2p(^2P^\circ)4d$	$4d\,^1P^\circ$	1	*84032*	
$4d\,^3P_2$	$2s^2\,2p(^2P^\circ)4d$	$4d\,^3P^\circ$	2	*84102.6*	−9
$^3P_1$			1	*84112*	
$^3P_0$			0		
$5p\,^1P_1$	$2s^2\,2p(^2P^\circ)5p$	$5p\,^1P$	1	84852.13	
	$2s^2\,2p(^2P^\circ)5p$	$5p\,^3D$	1		
$5p\,^3D_2$			2	84952	34
$^3D_3$			3	84986.2	
$5p\,^1D_2$	$2s^2\,2p(^2P^\circ)5p$	$5p\,^1D$	2	85400.38	
$5p\,^1S_0$	$2s^2\,2p(^2P^\circ)5p$	$5p\,^1S$	0	85625.84	
$5d\,^1D_2$	$2s^2\,2p(^2P^\circ)5d$	$5d\,^1D^\circ$	2	*86187*	
$5d\,^3F_2$	$2s^2\,2p(^2P^\circ)5d$	$5d\,^3F^\circ$	2	*86319*	8
$^3F_3$			3	*86326.9*	
			4		
	$2s^2\,2p(^2P^\circ)5d$	$5d\,^3D^\circ$	1		
$5d\,^3D_2$			2	*86371.3*	25
$^3D_3$			3	*86396*	
$6s\,^1P_1$	$2s^2\,2p(^2P^\circ)6s$	$6s\,^1P^\circ$	1	*86413.96*	
$5d\,^1F_3$	$2s^2\,2p(^2P^\circ)5d$	$5d\,^1F^\circ$	3	*86450*	
$5d\,^1P_1$	$2s^2\,2p(^2P^\circ)5d$	$5d\,^1P^\circ$	1	*86491*	
$5d\,^3P_2$	$2s^2\,2p(^2P^\circ)5d$	$5d\,^3P^\circ$	2	*86504*	−13
$^3P_1$			1	*86517*	
			0		
$6d\,^1D_2$	$2s^2\,2p(^2P^\circ)6d$	$6d\,^1D^\circ$	2	*87632*	
$6d\,^3F_2$	$2s^2\,2p(^2P^\circ)6d$	$6d\,^3F^\circ$	2	*87706*	7
$^3F_3$			3	*87713*	
			4		
	$2s^2\,2p(^2P^\circ)6d$	$6d\,^3D^\circ$	1		
$6d\,^3D_2$			2	*87752*	21
$^3D_3$			3	*87773*	
$7s\,^1P_1$	$2s^2\,2p(^2P^\circ)7s$	$7s\,^1P^\circ$	1	*87795.3*	
$6d\,^1F_3$	$2s^2\,2p(^2P^\circ)6d$	$6d\,^1F^\circ$	3	*87807*	
$6d\,^3P_2$	$2s^2\,2p(^2P^\circ)6d$	$6d\,^3P^\circ$	2	*87830*	−9
$^3P_1$			1	*87839*	
			0		
$6d\,^1P_1$	$2s^2\,2p(^2P^\circ)6d$	$6d\,^1P^\circ$	1	*87831.3*	
$7d\,^3F_2$	$2s^2\,2p(^2P^\circ)7d$	$7d\,^3F^\circ$	2	*88541.8*	5
$^3F_3$			3	*88547*	
$^3F_4$			4		
	$2s^2\,2p(^2P^\circ)7d$	$7d\,^3D^\circ$	1		
			2		
$7d\,^3D_3$			3	*88607*	

C I—Continued

Edlén	Config.	Desig.	J	Level	Interval
$7d\ ^1F_3$	$2s^2\ 2p(^2P^\circ)7d$	$7d\ ^1F^\circ$	3	88624	
$7d\ ^1P_1$	$2s^2\ 2p(^2P^\circ)7d$	$7d\ ^1P^\circ$	1	88632.44	
$7d\ ^3P_2$	$2s^2\ 2p(^2P^\circ)7d$	$7d\ ^3P^\circ$	2	88639	
			1		
			0		
	$2s^2\ 2p(^2P^\circ)8d$	$8d\ ^3F^\circ$	4		
$8d\ ^3F_3$			3	89081	−1
$^3F_2$			2	89082	
	$2s^2\ 2p(^2P^\circ)8d$	$8d\ ^3D^\circ$	1		
			2		
$8d\ ^3D_3$			3	89146	
$8d\ ^1F_3$	$2s^2\ 2p(^2P^\circ)8d$	$8d\ ^1F^\circ$	3	89155	
$8d\ ^3P_2$	$2s^2\ 2p(^2P^\circ)8d$	$8d\ ^3P^\circ$	2	89158	
			1		
			0		
	$2s^2\ 2p(^2P^\circ)9d$	$9d\ ^3F^\circ$	4		
			3		
$9d\ ^3F_2$			2	89450	

C I—Continued

Edlén	Config.	Desig.	J	Level	Interval
	$2s^2\ 2p(^2P^\circ)9d$	$9d\ ^3D^\circ$	1		
			2		
$9d\ ^3D_3$			3	89514	
$9d\ ^1F_3$	$2s^2\ 2p(^2P^\circ)9d$	$9d\ ^1F^\circ$	3	89517	
	$2s^2\ 2p(^2P^\circ)10d$	$10d\ ^3D^\circ$	1		
			2		
$10d\ ^3D_3$			3	89779	
	$2s^2\ 2p(^2P^\circ)11d$	$11d\ ^3D^\circ$	1		
			2		
$11d\ ^3D_3$			3	89968.4	
	C II ($^2P^\circ_{1/2}$)	*Limit*	------	**90878.3**	
$2p'\ ^1D_2$	$2s\ 2p^3$	$2p^3\ ^1D^\circ$	2	[97878]	
	$2s\ 2p^3(^4P)3s$	$3s\ ^5P$	1	103541.8	
			2	103562.5	20.7
			3	103587.3	24.8
$2p'\ ^3S_1$	$2s\ 2p^3$	$2p^3\ ^3S^\circ$	1	105800.5	
$2p'\ ^1P_1$	$2s\ 2p^3$	$2p^3\ ^1P^\circ$	1	[119878]	

September 1947.

C I Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2\ 2p^2$	$2p^2\ ^1S$; $2p^2\ ^3P$; $2p^2\ ^1D$		
$2s\ 2p^3$	$2p^3\ ^5S^\circ$; $2p^3\ ^3S^\circ$; $2p^3\ ^3P^\circ$; $2p^3\ ^3D^\circ$		
	ns ($n\geq 3$)	np ($n\geq 3$)	nd ($n\geq 3$)
$2s^2\ 2p(^2P^\circ)nx$	3, $4s\ ^3P^\circ$ 3–$7s\ ^1P^\circ$	3, $4p\ ^3S$ 3, $4p\ ^3P$ 3–$5p\ ^3D$ 3–$5p\ ^1S$ 3–$5p\ ^1P$ 3–$5p\ ^1D$	3–$8d\ ^3P^\circ$ 3–$11d\ ^3D^\circ$ 3–$9d\ ^3F^\circ$ 3–$7d\ ^1P^\circ$ 3–$6d\ ^1D^\circ$ 3–$9d\ ^1F^\circ$
$2s\ 2p^3(^4P)nx$	$3s\ ^5P$		

*For predicted terms in the spectra of the C I isoelectronic sequence, see Introduction.

C II

(B I sequence; 5 electrons) $Z=6$

Ground state $1s^2\,2s^2\,2p\ ^2P^\circ_{1/2}$

$2p\ ^2P^\circ_{1/2}$ ***196659.0*** cm^{-1} I. P. 24.376 volts

The term values for the doublets are taken from Edlén's Monograph. He has since rejected his $5p'\ ^2D$ term. Intersystem combinations have been observed by Edlén (1936) and the resulting correction to the quartet terms as published in his Monograph, $+19.3$ cm^{-1}, has been applied.

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C II

Edlén	Config.	Desig.	J	Level	Interval
$2p\ ^2P_1$	$2s^2(^1S)2p$	$2p\ ^2P^\circ$	½	*0.0*	64.0
$^2P_2$			1½	*64.0*	
$2p'\ ^4P_1$	$2s\,2p^2$	$2p^2\ ^4P$	½	43000.2	21.6
$^4P_2$			1½	43021.8	28.9
$^4P_3$			2½	43050.7	
$2p'\ ^2D_3$	$2s\,2p^2$	$2p^2\ ^2D$	2½	74930.9	−2.3
$^2D_2$			1½	74933.2	
$2p'\ ^2S_1$	$2s\,2p^2$	$2p^2\ ^2S$	½	96494.1	
$2p'\ ^2P_1$	$2s\,2p^2$	$2p^2\ ^2P$	½	110625.1	41.2
$^2P_2$			1½	110666.3	
$3s\ ^2S_1$	$2s^2(^1S)3s$	$3s\ ^2S$	½	116537.88	
$3p\ ^2P_1$	$2s^2(^1S)3p$	$3p\ ^2P^\circ$	½	*131724.68*	11.13
$^2P_2$			1½	*131735.81*	
$2p''\ ^4S_2$	$2p^3$	$2p^3\ ^4S^\circ$	1½	*142024.4*	
$3d\ ^2D_2$	$2s^2\ (^1S)3d$	$3d\ ^2D$	1½	145549.99	1.45
$^2D_3$			2½	145551.44	
$2p''\ ^2D_3$	$2p^3$	$2p^3\ ^2D^\circ$	2½	*150462.8*	−5.1
$^2D_2$			1½	*150467.9*	
$4s\ ^2S_1$	$2s^2(^1S)4s$	$4s\ ^2S$	½	157234.43	
$4p\ ^2P_1$	$2s^2(^1S)4p$	$4p\ ^2P^\circ$	½	*162518.70*	5.92
$^2P_2$			1½	*162524.62*	
$3s'\ ^4P_1$	$2s\,2p(^3P^\circ)3s$	$3s\ ^4P^\circ$	½	*166964.70*	23.76
$^4P_2$			1½	*166988.46*	44.97
$^4P_3$			2½	*167033.43*	
$4d\ ^2D_2$	$2s^2(^1S)4d$	$4d\ ^2D$	1½	168123.92	0.41
$^2D_3$			2½	168124.33	
$2p''\ ^2P_1$	$2p^3$	$2p^3\ ^2P^\circ$	½	*168731.6*	18.6
$^2P_2$			1½	*168750.2*	
$4f\ ^2F$	$2s^2(^1S)4f$	$4f\ ^2F^\circ$	{2½, 3½}	*168979.05*	

C II

Edlén	Config.	Desig.	J	Level	Interval
$5s\ ^2S_1$	$2s^2(^1S)5s$	$5s\ ^2S$	½	173348.18	
$5p\ ^2P_1$	$2s^2(^1S)5p$	$5p\ ^2P^\circ$	½	*175287.9*	7.3
$^2P_2$			1½	*175295.2*	
$3s'\ ^2P_1$	$2s\,2p(^3P^\circ)3s$	$3s\ ^2P^\circ$	½	*178194.1*	26.7
$^2P_2$			1½	*178220.8*	
	$2s^2(^1S)5d$	$5d\ ^2D$	1½		
$5d\ ^2D_3$			2½	178494.8	
$5f\ ^2F$	$2s^2(^1S)5f$	$5f\ ^2F^\circ$	{2½, 3½}	*178956.46*	
$6s\ ^2S_1$	$2s^2(^1S)6s$	$6s\ ^2S$	½	181258	
$3p'\ ^4D_1$	$2s\,2p(^3P^\circ)3p$	$3p\ ^4D$	½	181694.50	14.70
$^4D_2$			1½	181709.20	25.01
$^4D_3$			2½	181734.21	36.27
$^4D_4$			3½	181770.48	
$3p'\ ^2P_1$	$2s\,2p(^3P^\circ)3p$	$3p\ ^2P$	½	182025.0	19.5
$^2P_2$			1½	182044.5	
	$2s^2(^1S)6d$	$6d\ ^2D$	1½		
$6d\ ^2D_3$			2½	184064.9	
$6f\ ^2F$	$2s^2(^1S)6f$	$6f\ ^2F^\circ$	{2½, 3½}	*184376.20*	
$3p'\ ^4S_2$	$2s\,2p(^3P^\circ)3p$	$3p\ ^4S$	1½	184688.69	
$3p'\ ^4P_1$	$2s\,2p(^3P^\circ)3p$	$3p\ ^4P$	½	186425.02	16.30
$^4P_2$			1½	186441.32	22.43
$^4P_3$			2½	186463.75	
$3p'\ ^2D_2$	$2s\,2p(^3P^\circ)3p$	$3p\ ^2D$	1½	188579.3	33.4
$^2D_3$			2½	188612.7	
$3p'\ ^2S_1$	$2s\,2p(^3P^\circ)3p$	$3p\ ^2S$	½	194571.9	
$3d'\ ^4F_2$	$2s\,2p(^3P^\circ)3d$	$3d\ ^4F^\circ$	1½	*195750.8*	14.3
$^4F_3$			2½	*195765.1*	19.6
$^4F_4$			3½	*195784.7*	27.6
$^4F_5$			4½	*195812.3*	

C II—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3d'\ ^4D_1$	$2s\,2p(^3P^\circ)3d$	$3d\ ^4D^\circ$	½	*196556.2*	
$^4D_2$			1½	*196561.8*	5.6
$^4D_3$			2½	*196570.5*	8.7
$^4D_4$			3½	*196580.8*	10.3
	C III ($^1S_0$)	*Limit*	------	***196659.0***	
$3d'\ ^2D_2$	$2s\,2p(^3P^\circ)3d$	$3d\ ^2D^\circ$	1½	*198426.4*	
$^2D_3$			2½	*198437.2*	10.8
$3d'\ ^4P_3$	$2s\,2p(^3P^\circ)3d$	$3d\ ^4P^\circ$	2½	*198842.0*	
$^4P_2$			1½	*198863.5*	−21.5
$^4P_1$			½	*198877.7*	−14.2
$3d'\ ^2F_3$	$2s\,2p(^3P^\circ)3d$	$3d\ ^2F^\circ$	2½	*199941.4*	
$^2F_4$			3½	*199984.2*	42.8
$3d'\ ^2P_2$	$2s\,2p(^3P^\circ)3d$	$3d\ ^2P^\circ$	1½	*202180.3*	
$^2P_1$			½	*202204.4*	−24.1
$4s'\ ^4P_1$	$2s\,2p(^3P^\circ)4s$	$4s\ ^4P^\circ$	½	*209550.26*	
$^4P_2$			1½	*209574.28*	24.02
$^4P_3$			2½	*209620.36*	46.08
$4p'\ ^2P_1$	$2s\,2p(^3P^\circ)4p$	$4p\ ^2P$	½	214406.6	
$^2P_2$			1½	214429.7	23.1
$4p'\ ^4D_1$	$2s\,2p(^3P^\circ)4p$	$4p\ ^4D$	½	214758.3	
$^4D_2$			1½	214772.6	14.3
$^4D_3$			2½	214794.6	22.0
$^4D_4$			3½	214828.0	33.4
$4p'\ ^4S_2$	$2s\,2p(^3P^\circ)4p$	$4p\ ^4S$	1½	215765.6	
	$2s\,2p(^3P^\circ)4p$	$4p\ ^4P$	½		
$4p'\ ^4P_2$			1½	216378.0	
$^4P_3$			2½	216397.7	19.7
	$2s\,2p(^3P^\circ)4p$	$4p\ ^2D$	1½		
$4p'\ ^2D_3$			2½	216927	
$4d'\ ^4F_2$	$2s\,2p(^3P^\circ)4d$	$4d\ ^4F^\circ$	1½	*219553.8*	
$^4F_3$			2½	*219568.5*	14.7
$^4F_4$			3½	*219589.2*	20.7
$^4F_5$			4½	*219617.0*	27.8
	$2s\,2p(^3P^\circ)4d$	$4d\ ^4D^\circ$	½		
$4d'\ ^4D_2$			1½	*220127.8*	
$^4D_3$			2½	*220137.0*	9.2
$^4D_4$			3½	*220147.6*	10.6
$4d'\ ^2D_2$	$2s\,2p(^3P^\circ)4d$	$4d\ ^2D^\circ$	1½	*220601.1*	
$^2D_3$			2½	*220614.2*	13.1
$4d'\ ^4P_3$	$2s\,2p(^3P^\circ)4d$	$4d\ ^4P^\circ$	2½	*220808.47*	
$^4P_2$			1½	*220828.97*	−20.50
$^4P_1$			½	*220840.87*	−11.90
$4f'\ ^2F_3$	$2s\,2p(^3P^\circ)4f$	$4f\ ^2F$	2½	221089.6	
$^2F_4$			3½	221098.8	9.2
	$2s\,(2p(^3P^\circ)4f$	$4f\ ^4F$	1½		
			2½		
$4f'\ ^4F_4$			3½	221106.3	
$^4F_5$			4½	221107.4	1.1

C II—Continued

Edlén	Config.	Desig.	J	Level	Interval
	$2s\,2p(^3P^\circ)4d$	$4d\ ^2F^\circ$	2½		
$4d'\ ^2F_4$			3½	*221502*	
$4f'\ ^4G_3$	$2s\,2p(^3P^\circ)4f$	$4f\ ^4G$	2½	221543.0	
$^4G_4$			3½	221553.2	10.2
$^4G_5$			4½	221574.5	21.3
$^4G_6$			5½	221603.6	29.1
$4f'\ ^2G_4$	$2s\,2p(^3P^\circ)4f$	$4f\ ^2G$	3½	221585	
$^2G_5$			4½	221628	43
$4f'\ ^4D_4$	$2s\,2p(^3P^\circ)4f$	$4f\ ^4D$	3½	221696.5	
$^4D_3$			2½	221727.4	−30.9
$^4D_2$			1½	221746.3	−18.9
			½		
$4f'\ ^2D_3$	$2s\,2p(^3P^\circ)4f$	$4f\ ^2D$	2½	221707.9	
$^2D_2$			1½	221752.9	−45.0
$4d'\ ^2P_2$	$2s\,2p(^3P^\circ)4d$	$4d\ ^2P^\circ$	1½	*222259.1*	
$^2P_1$			½	*222286.0*	−26.9
	$2s\,2p(^3P^\circ)5s$	$5s\ ^4P^\circ$	½		
			1½		
$5s'\ ^4P_3$			2½	*225813*	
$5p'\ ^2P$	$2s\,2p(^3P^\circ)5p$	$5p\ ^2P$	{½, 1½}	227901	
	$2s\,2p(^3P^\circ)5d$	$5d\ ^4D^\circ$	½		
			1½		
			2½		
$5d'\ ^4D_4$			3½	*230763*	
$5d'\ ^4P_3$	$2s\,2p(^3P^\circ)5d$	$5d\ ^4P^\circ$	2½	*231050*	
			1½		
			½		
$5f'\ ^2F$	$2s\,2p(^3P^\circ)5f$	$5f\ ^2F$	{2½, 3½}	231221	
	$2s\,2p(^3P^\circ)5f$	$5f\ ^4F$	1½		
			2½		
			3½		
$5f'\ ^4F_5$			4½	231226.8	
	$2s\,2p(^3P^\circ)5f$	$5f\ ^4G$	2½		
			3½		
			4½		
$5f'\ ^4G_6$			5½	231499.3	
$5f'\ ^4D_4$	$2s\,2p(^3P^\circ)5f$	$5f\ ^4D$	3½	231520.4	
			2½		
			1½		
			½		
	$2s\,2p(^3P^\circ)6d$	$6d\ ^4D^\circ$	½		
			1½		
			2½		
$6d'\ ^4D_4$			3½	*236444*	
$6d'\ ^4P_3$	$2s\,2p(^3P^\circ)6d$	$6d\ ^4P^\circ$	2½	*236605*	
			1½		
			½		

December 1947.

C II OBSERVED TERMS*

Config. $1s^2+$	Observed Terms			
$2s^2(^1S)2p$	$2p\ ^2P^\circ$			
$2s\ 2p^2$	$2p^2\ ^2S$; $2p^2\ ^4P$, $2p^2\ ^2P$; $2p^2\ ^2D$			
$2p^3$	$2p^3\ ^4S^\circ$; $2p^3\ ^2P^\circ$; $2p^3\ ^2D^\circ$			
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$	$nf\ (n\geq 4)$
$2s^2(^1S)nx$	3–$6s\ ^2S$	3–$5p\ ^2P^\circ$	3–$6d\ ^2D$	4–$6f\ ^2F^\circ$
$2s\ 2p(^3P^\circ)nx$	3–$5s\ ^4P^\circ$ $3s\ ^2P^\circ$	3, $4p\ ^4S$ 3, $4p\ ^4P$ 3, $4p\ ^4D$ $3p\ ^2S$ 3, $5p\ ^2P$ 3, $4p\ ^2D$	3–$6d\ ^4P^\circ$ 3–$6d\ ^4D^\circ$ 3, $4d\ ^4F^\circ$ 3, $4d\ ^2P^\circ$ 3, $4d\ ^2D^\circ$ 3, $4d\ ^2F^\circ$	4, $5f\ ^4D$ 4, $5f\ ^4F$ 4, $5f\ ^4G$ $4f\ ^2D$ 4, $5f\ ^2F$ $4f\ ^2G$

*For predicted terms in the spectra of the B I isoelectronic sequence, see Introduction.

C III

(Be I sequence; 4 electrons) $Z=6$

Ground state $1s^2\ 2s^2\ ^1S_0$

$2s^2\ ^1S_0$ **386159. 7** cm^{-1} I. P. 47.864 volts

All but three terms are from Edlén's Monograph. For the terms $7d\ ^3D$, $8d\ ^3D$, and $9d\ ^3D$ the revised values of Whitelaw and Mack have been used. Edlén has since rejected his $4d'\ ^1P$ term.

No intersystem combinations have been found with certainty. The long D-series determine the limits to about ± 25 cm^{-1}. The uncertainty x in the relative positions of the singlets and triplets is, therefore, less than ± 50 cm^{-1} according to Edlén. No trace of the line predicted at 1910.7 ± 2 A, $2s^2\ ^1S_0-2p\ ^3P^\circ_1$, is visible on his plates. A line observed at 339 A (294314.1 cm^{-1}) agrees within 4 cm^{-1} with the calculated combination $2p\ ^3P^\circ_1-5d\ ^1D_2$. This identification is uncertain, since it is not confirmed by other intersystem combinations.

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N. G. Whitelaw and J. E. Mack, Phys. Rev. **47**, 677 (1935). (T)
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C III C III

Edlén	Config.	Desig.	J	Level	Interval	Edlén	Config.	Desig.	J	Level	Interval
$2s\ ^1S_0$	$2s^2$	$2s^2\ ^1S$	0	0. 0		$2p'\ ^1D_2$	$2p^2$	$2p^2\ ^1D$	2	145875. 1	
$2p\ ^3P_0$	$2s(^2S)2p$	$2p\ ^3P^\circ$	0	*52315. 0*$+x$		$2p'\ ^1S_0$	$2p^2$	$2p^2\ ^1S$	0	182520. 2	
$^3P_1$			1	*52338. 0*$+x$	23. 0						
$^3P_2$			2	*52394. 8*$+x$	56. 8	$3s\ ^3S_1$	$2s(^2S)3s$	$3s\ ^3S$	1	238160. 7$+x$	
$2p\ ^1P_1$	$2s(^2S)2p$	$2p\ ^1P^\circ$	1	*102351. 4*		$3s\ ^1S_0$	$2s(^2S)3s$	$3s\ ^1S$	0	247169. 5	
$2p'\ ^3P_0$	$2p^2$	$2p^2\ ^3P$	0	137374. 0$+x$		$3p\ ^1P_1$	$2s(^2S)3p$	$3p\ ^1P^\circ$	1	*258931. 4*	
$^3P_1$			1	137403. 4$+x$	29. 4						
$^3P_2$			2	137450. 5$+x$	47. 1						

C III—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3p\ ^3P_0$	$2s(^2S)3p$	$3p\ ^3P^\circ$	0	259653.8+x	
$^3P_1$			1	259659.3+x	5.5
$^3P_2$			2	259672.1+x	12.8
$3d\ ^3D_1$	$2s(^2S)3d$	$3d\ ^3D$	1	269957.6+x	
$^3D_2$			2	269959.7+x	2.1
$^3D_3$			3	269962.9+x	3.2
$3d\ ^1D_2$	$2s(^2S)3d$	$3d\ ^1D$	2	276482.7	
$3s'\ ^3P_0$	$2p(^2P^\circ)3s$	$3s\ ^3P^\circ$	0	308162.9+x	
$^3P_1$			1	308196.2+x	33.3
$^3P_2$			2	308264.8+x	68.6
$4s\ ^3S_1$	$2s(^2S)4s$	$4s\ ^3S$	1	309404.5+x	
$3s'\ ^1P_1$	$2p(^2P^\circ)3s$	$3s\ ^1P^\circ$	1	310005.2	
$4s\ ^1S_0$	$2s(^2S)4s$	$4s\ ^1S$	0	311720.7	
$4p\ ^3P_{01}$	$2s(^2S)4p$	$4p\ ^3P^\circ$	0, 1	317743 +x	
$^3P_2$			2	317748 +x	5
$3p'\ ^1P_1$	$2p(^2P^\circ)3p$	$3p\ ^1P$	1	319719.4	
$4d\ ^3D_1$	$2s(^2S)4d$	$4d\ ^3D$	1	321358.8+x	
$^3D_2$			2	321375.1+x	16.3
$^3D_3$			3	321398.6+x	23.5
$4f\ ^3F_2$	$2s\ (^2S)4f$	$4f\ ^3F^\circ$	2	321949.1+x	
$^3F_3$			3	321955.8+x	6.7
$^3F_4$			4	321964.7+x	8.9
$4p\ ^1P_1$	$2s(^2S)4p$	$4p\ ^1P^\circ$	1	322403.1	
$4f\ ^1F_3$	$2s(^2S)4f$	$4f\ ^1F^\circ$	3	322701.1	
$3p'\ ^3D_1$	$2p(^2P^\circ)3p$	$3p\ ^3D$	1	323024.0+x	
$^3D_2$			2	323049.4+x	25.4
$^3D_3$			3	323088.2+x	38.8
$4d\ ^1D_2$	$2s(^2S)4d$	$4d\ ^1D$	2	324212.0	
$3p'\ ^3S_1$	$2p(^2P^\circ)3p$	$3p\ ^3S$	1	327225.7+x	
$3p'\ ^3P_0$	$2p(^2P^\circ)3p$	$3p\ ^3P$	0	329633.1+x	
$^3P_1$			1	329654.2+x	21.1
$^3P_2$			2	329690.9+x	36.7
$3d'\ ^1D_2$	$2p(^2P^\circ)3d$	$3d\ ^1D^\circ$	2	332690.3	
$3p'\ ^1D_2$	$2p(^2P^\circ)3p$	$3p\ ^1D$	2	333116.4	
$3d'\ ^3F_2$	$2p(^2P^\circ)3d$	$3d\ ^3F^\circ$	2	333333.4+x	
$^3F_3$			3	333358.4+x	25.0
$^3F_4$			4	333395.0+x	36.6
$3d'\ ^3D_1$	$2p(^2P^\circ)3d$	$3d\ ^3D^\circ$	1	337602.9+x	
$^3D_2$			2	337616.4+x	13.5
$^3D_3$			3	337636.7+x	20.3
$5s\ ^3S_1$	$2s(^2S)5s$	$5s\ ^3S$	1	339881 +x	
$3d'\ ^3P_2$	$2p(^2P^\circ)3d$	$3d\ ^3P^\circ$	2	340049.5+x	
$^3P_1$			1	340075.8+x	−26.3
$^3P_0$			0	340090.3+x	−14.5
$3d'\ ^1F_3$	$2p(^2P^\circ)3d$	$3d\ ^1F^\circ$	3	341368.5	
$5p\ ^1P_1$	$2s(^2S)5p$	$5p\ ^1P^\circ$	1	343255.7	
	$2s(^2S)5p$	$5p\ ^3P^\circ$	0		
			1		
$5p\ ^3P_2$			2	344181 +x	
$3p'\ ^1S_0$	$2p(^2P^\circ)3p$	$3p\ ^1S$	0	345093.9	

C III—Continued

Edlén	Config.	Desig.	J	Level	Interval
	$2s(^2S)5d$	$5d\ ^3D$	1		
			2		
$5d\ ^3D_3$			3	345444 +x	
	$2s(^2S)5g$	$5g\ ^3G$	3		
$5g\ ^3G_4$			4	346525.1+x	
$^3G_5$			5	346526.0+x	0.9
$5g\ ^1G_4$	$2s(^2S)5g$	$5g\ ^1G$	4	346577.5	
$5d\ ^1D_2$	$2s(^2S)5d$	$5d\ ^1D$	2	346656.0	
$3d'\ ^1P_1$	$2p(^2P^\circ)3d$	$3d\ ^1P^\circ$	1	346713.1	
$5f\ ^3F_2$	$2s(^2S)5f$	$5f\ ^3F^\circ$	2	347099.5+x	
$^3F_3$			3	347101.3+x	1.8
$^3F_4$			4	347103.7+x	2.4
$5f\ ^1F_3$	$2s(^2S)5f$	$5f\ ^1F^\circ$	3	348859.5	
$6s\ ^3S_1$	$2s(^2S)6s$	$6s\ ^3S$	1	354796 +x	
$6p\ ^1P_1$	$2s(^2S)6p$	$6p\ ^1P^\circ$	1	357088	
	$2s(^2S)6d$	$6d\ ^3D$	1		
			2		
$6d\ ^3D_3$			3	358046 +x	
	$2s(^2S)6g$	$6g\ ^3G$	3		
$6g\ ^3G_4$			4	358638.3+x	
$^3G_5$			5	358639.0+x	0.7
$6g\ ^1G_4$	$2s(^2S)6g$	$6g\ ^1G$	4	358688.9	
$6d\ ^1D_2$	$2s(^2S)6d$	$6d\ ^1D$	2	358725.5	
	$2s(^2S)6f$	$6f\ ^3F^\circ$	2		
			3		
$6f\ ^3F_4$			4	358800 +x	
$6f\ ^1F_3$	$2s(^2S)6f$	$6f\ ^1F^\circ$	3	359122.2	
$7s\ ^3S_1$	$2s(^2S)7s$	$7s\ ^3S$	1	363561 +x	
$7p\ ^1P_1$	$2s(^2S)7p$	$7p\ ^1P^\circ$	1	364896	
$7d\ ^3D$	$2s(^2S)7d$	$7d\ ^3D$	1, 2, 3	365585 +x	
$7d\ ^1D_2$	$2s(^2S)7d$	$7d\ ^1D$	2	366027.0	
$8p\ ^1P_1$	$2s(^2S)8p$	$8p\ ^1P^\circ$	1	369926	
$8d\ ^3D$	$2s(^2S)8d$	$8d\ ^3D$	1, 2, 3	370438 +x	
$9d\ ^3D$	$2s(^2S)9d$	$9d\ ^3D$	1, 2, 3	373748 +x	
	$2p(^2P^\circ)4s$	$4s\ ^3P^\circ$	0		
			1		
$4s'\ ^3P_2$			2	376637 +x	
$4p'\ ^1P_1$	$2p(^2P^\circ)4p$	$4p\ ^1P$	1	381104.8	
	$2p(^2P^\circ)4p$	$4p\ ^3D$	1		
$4p'\ ^3D_2$			2	381919 +x	
$^3D_3$			3	381958 +x	39
	$2p(^2P^\circ)4p$	$4p\ ^3P$	0		
$4p'\ ^3P_1$			1	384313 +x	
$^3P_2$			2	384350 +x	37
$4p'\ ^1D_2$	$2p(^2P^\circ)4p$	$4p\ ^1D$	2	385637.5	
$4d'\ ^1D_2$	$2p(^2P^\circ)4d$	$4d\ ^1D^\circ$	2	385816.2	
	C IV $(^2S_{1/2})$	*Limit*	------	386159.7	

C III—Continued

Edlén	Config.	Desig.	J	Level	Interval
	$2p(^2P^\circ)4d$	$4d\ ^3D^\circ$	1		
			2		
$4d'\ ^3D_3$			3	*387646* $+x$	
$4d'\ ^3P_2$	$2p(^2P^\circ)4d$	$4d\ ^3P^\circ$	2	*388442* $+x$	
			1		
			0		
$4d'\ ^1F_3$	$2p(^2P^\circ)4d$	$4d\ ^1F^\circ$	3	*388772.2*	
$5p'\ ^1P_1$	$2p(^2P^\circ)5p$	$5p\ ^1P$	1	407430.4	
	$2p(^2P^\circ)5p$	$5p\ ^3D$	1		
			2		
$5p'\ ^3D_3$			3	407774 $+x$	
	$2p(^2P^\circ)5p$	$5p\ ^3P$	0		
			1		
$5p'\ ^3P_2$			2	408873 $+x$	
$5p'\ ^1D_2$	$2p(^2P^\circ)5p$	$5p\ ^1D$	2	409505.0	
$5d'\ ^1D_2$	$2p(^2P^\circ)5d$	$5d\ ^1D^\circ$	2	*409682.1*	
	$2p(^2P^\circ)5d$	$5d\ ^3D^\circ$	1		
			2		
$5d'\ ^3D_3$			3	*410534* $+x$	
$5d'\ ^3P_2$	$2p(^2P^\circ)5d$	$5d\ ^3P^\circ$	2	*410841* $+x$	
			1		
			0		
	$2p(^2P^\circ)6p$	$6p\ ^3D$	1		
			2		
$6p'\ ^3D_3$			3	421380 $+x$	
	$2p(^2P^\circ)6p$	$6p\ ^3P$	0		
			1		
$6p'\ ^3P_2$			2	421967 $+x$	
	$2p(^2P^\circ)6d$	$6d\ ^3D^\circ$	1		
			2		
$6d'\ ^3D_3$			3	*422881* $+x$	
$6d'\ ^3P_2$	$2p(^2P^\circ)6d$	$6d\ ^3P^\circ$	2	*423058* $+x$	
			1		
			0		
	$2p(^2P^\circ)7p$	$7p\ ^3D$	1		
			2		
$7p'\ ^3D_3$			3	429345 $+x$	
	$2p(^2P^\circ)7p$	$7p\ ^3P$	0		
			1		
$7p'\ ^3P_2$			2	429712 $+x$	

December 1947.

C III Observed Terms*

Config. $1s^2+$	Observed Terms				
$2s^2$	$2s^2\ ^1S$				
$2s(^2S)2p$	$2p\ ^3P^\circ$ $2p\ ^1P^\circ$				
$2p^2$	$2p^2\ ^1S$; $2p^2\ ^3P$; $2p^2\ ^1D$				
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$	$nf\ (n\geq 4)$	$ng\ (n\geq 5)$
$2s(^2S)nx$	$3\text{–}7s\ ^3S$ $3, 4s\ ^1S$	$3\text{–}5p\ ^3P^\circ$ $3\text{–}8p\ ^1P^\circ$	$3\text{–}9d\ ^3D$ $3\text{–}7d\ ^1D$	$4\text{–}6f\ ^3F^\circ$ $4\text{–}6f\ ^1F^\circ$	$5, 6g\ ^3G$ $5, 6g\ ^1G$
$2p(^2P^\circ)nx$	$3, 4s\ ^3P^\circ$ $3s\ ^1P^\circ$	$3p\ ^3S$ $3\text{–}7p\ ^3P$ $3\text{–}7p\ ^3D$ $3p\ ^1S$ $3\text{–}5p\ ^1P$ $3\text{–}5p\ ^1D$	$3\text{–}6d\ ^3P^\circ$ $3\text{–}6d\ ^3D^\circ$ $3d\ ^3F^\circ$ $3d\ ^1P^\circ$ $3\text{–}5d\ ^1D^\circ$ $3, 4d\ ^1F^\circ$		

*For predicted terms of the Be I isoelectronic sequence, see Introduction.

C IV

(Li I sequence; 3 electrons) $Z=6$

Ground state $1s^2\ 2s\ ^2S_{1/2}$

$2s\ ^2S_{1/2}$ 520177.8 cm^{-1} I. P. 64.476 volts

The terms are from Edlén. His extrapolated values of three intervals and the term values of the two high series members $8f\ ^2F^\circ$ and $8g\ ^2G$, etc., which were calculated from a well-determined series formula, are entered in brackets in the table.

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C IV

Edlén	Config.	Desig.	J	Level	Interval
$2s\ ^2S_1$	2s	$2s\ ^2S$	½	0.0	
$2p\ ^2P_1$ $^2P_2$	2p	$2p\ ^2P^\circ$	½ 1½	*64484.2* *64591.3*	[107.1
$3s\ ^2S_1$	3s	$3s\ ^2S$	½	302847.9	
$3p\ ^2P_1$ $^2P_2$	3p	$3p\ ^2P^\circ$	½ 1½	*320048.5* *320080.0*	[31.5
$3d\ ^2D_2$ $^2D_3$	3d	$3d\ ^2D$	1½ 2½	324880.2 324890.9	[10.7]
$4s\ ^2S_1$	4s	$4s\ ^2S$	½	401346.7	
$4p\ ^2P_1$ $^2P_2$	4p	$4p\ ^2P^\circ$	½ 1½	*408308.9* *408322.2*	13.3
$4d\ ^2D_2$ $^2D_3$	4d	$4d\ ^2D$	1½ 2½	410333.8 410338.2	4.4
$4f\ ^2F_4$	4f	$4f\ ^2F^\circ$	2½ 3½	*410434.1*	[2.1]
$5s\ ^2S_1$	5s	$5s\ ^2S$	½	445366.1	
$5p\ ^2P_1$ $^2P_2$	5p	$5p\ ^2P^\circ$	½ 1½	*448854* *448861*	[6.7]
$5d\ ^2D_3$	5d	$5d\ ^2D$	1½ 2½	449887.4	[2.2]
$5f\ ^2F$	5f	$5f\ ^2F^\circ$	{2½ 3½}	*449938.2*	
$5g\ ^2G$	5g	$5g\ ^2G$	{3½ 4½}	449948.4	
$6s\ ^2S_1$	6s	$6s\ ^2S$	½	468765	
$6p\ ^2P$	6p	$6p\ ^2P^\circ$	{½ 1½}	*470763*	

C IV

Edlén	Config.	Desig.	J	Level	Interval
$6d\ ^2D$	6d	$6d\ ^2D$	{1½ 2½}	471368	
$6f\ ^2F$	6f	$6f\ ^2F^\circ$	{2½ 3½}	*471403.0*	
$6g\ ^2G$	6g	$6g\ ^2G$	{3½ 4½}	471407.4	
$6h\ ^2H$	6h	$6h\ ^2H^\circ$	{4½ 5½}	*471407.9*	
$7s\ ^2S_1$	7s	$7s\ ^2S$	½	482659	
$7p\ ^2P$	7p	$7p\ ^2P^\circ$	{½ 1½}	*483931*	
$7d\ ^2D$	7d	$7d\ ^2D$	{1½ 2½}	484309	
$7f\ ^2F$	7f	$7f\ ^2F^\circ$	{2½ 3½}	*484343.8*	
$7g\ ^2G$	7g	$7g\ ^2G$	{3½ 4½}	484346.6	
$7h\ ^2H$	7h	$7h\ ^2H^\circ$	{4½ 5½}	*484346.9*	
$8p\ ^2P$	8p	$8p\ ^2P^\circ$	{½ 1½}	*492473*	
8F	8f	$8f\ ^2F^\circ$	{2½ 3½}	[*492743*]	
8GHIK	8g, etc.	$8g\ ^2G$, etc.	{3½ to 7½}	[492745]	
	C V ($^1S_0$)	*Limit*	------	520177.8	

April 1946.

761536°—46——3

C V

(He I sequence; 2 electrons) $Z=6$

Ground state $1s^2\ ^1S_0$

$1s^2\ ^1S_0$ **3162450±300** cm^{-1} I. P. 391.986±0.037 volts

The singlet terms are from Tyrén, who has reported (1940) nine lines visible on his spectrograms. His limit has been calculated from the series members $n=2$ to 6. The remaining singlet terms have been calculated from three classified lines at 32 A given in his 1936 paper. He has also classified a line at 40.731 A as the intersystem combination $1s^2\ ^1S_0 - 2p\ ^3P^\circ_1$. His unit, 10^3 cm^{-1} has here been changed to cm^{-1}.

The triplet terms are from an unpublished manuscript kindly furnished by Edlén, who states that the absolute term values of the triplets are based on an extrapolation of $3d\ ^3D$ from He I and Li II. The relative positions of the singlet and triplet terms thus determined confirm the intersystem combination reported by Tyrén.

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C V | C V

Config.	Desig.	J	Level	Interval	Config.	Desig.	J	Level	Interval
$1s^2$	$1s^2\ ^1S$	0	0		$1s\ 4p$	$4p\ ^1P^\circ$	1	*2991680*	
$1s\ 2s$	$2s\ ^3S$	1	2411266		$1s\ 5p$	$5p\ ^1P^\circ$	1	*3053060*	
$1s\ 2p$	$2p\ ^3P^\circ$	0 1 2	*2455165* *2455152* *2455288*	−13 136	$1s\ 6p$	$6p\ ^1P^\circ$	1	*3086420*	
					$1s\ 7p$	$7p\ ^1P^\circ$	1	*3106750*	
$1s\ 2p$	$2p\ ^1P^\circ$	1	*2483240*		$1s\ 8p$	$8p\ ^1P^\circ$	1	*3118760*	
$1s\ 3d$	$3d\ ^3D$	3, 2, 1	2857308						
$1s\ 3p$	$3p\ ^1P^\circ$	1	*2859350*		C VI ($^2S_{1/2}$)	*Limit*		**3162450**	

September 1947.

C VI

(H I sequence; 1 electron) $Z=6$

Ground state $1s\ ^2S_{½}$

$1s\ ^2S_{½}$ **3952252** cm^{-1} I. P. 489.882 volts

Edlén has calculated the positions of the first three members of the Lyman series, $1s\ ^2S-np\ ^2P°(n=2, 3, 4)$, using Penney's formula. These wavelengths, 33.734, 28.464, and 26.988 A, respectively, have been used to compute the term values listed here. The lines have all been observed by Tyrén.

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C VI

Config.	Desig.	J	Level
$1s$	$1s\ ^2S$	½	0
$2p$	$2p\ ^2P°$	½, 1½	*2964370*
$3p$	$3p\ ^2P°$	½, 1½	*3513210*

C VI

Config.	Desig.	J	Level
$4p$	$4p\ ^2P°$	½, 1½	*3705350*
	----------	----------	----------
	Limit	----------	**3952252**

October 1946.

NITROGEN

N I

7 electrons | $Z=7$

Ground state $1s^2\,2s^2\,2p^3\ {}^4S^{\circ}_{1\frac{1}{2}}$

$2p^3\ {}^4S^{\circ}_{1\frac{1}{2}}$ ***117345*** cm^{-1} | I. P. 14.54 volts

The terms have been taken chiefly from the list prepared by Ekefors with extensions calculated from the classifications published in Tokyo. Unfortunately, no term list was included in the Tokyo papers. Consequently, considerable editing has been done in compiling terms from all the observational material. Revised values are suggested for a few levels and tentative values not in the literature are listed for $5d\ {}^4F_{2\frac{1}{2}}$, $5d\ {}^4F_{1\frac{1}{2}}$, $5d\ {}^4D_{3\frac{1}{2}}$, and $6d\ {}^4D_{3\frac{1}{2}}$. Further study is needed to verify the numerous blends resulting from practically coincident levels.

Intersystem combinations have been observed.

Kiess has generously furnished his unpublished g-values derived from the observed Zeeman effects of 18 infrared lines.

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N I

Config.	Desig.	J	Level	Interval	Obs. g
$2s^2\,2p^3$	$2p^3\ {}^4S^{\circ}$	1½	*0*		
$2s^2\,2p^3$	$2p^3\ {}^2D^{\circ}$	2½	*19223*	−8	
		1½	*19231*		
$2s^2\,2p^3$	$2p^3\ {}^2P^{\circ}$	{1½, ½}	*28840*		
$2s^2\,2p^2(^3P)3s$	$3s\ {}^4P$	½	83285.5	33.8	2.670
		1½	83319.3	46.7	1.735
		2½	83366.0		1.603
$2s^2\,2p^2(^3P)3s$	$3s\ {}^2P$	½	86131.4	91.8	
		1½	86223.2		

N I

Config.	Desig.	J	Level	Interval	Obs. g
$2s\,2p^4$	$2p^4\ {}^4P$	2½	88109.5	−43.9	
		1½	88153.4	−19.6	
		½	88173.0		
$2s^2\,2p^2(^3P)3p$	$3p\ {}^2S^{\circ}$	½	*93582.3*		
$2s^2\,2p^2(^3P)3p$	$3p\ {}^4D^{\circ}$	½	*94772.2*	22.6	0.002
		1½	*94794.8*	37.3	1.19
		2½	*94832.1*	51.0	1.36
		3½	*94883.1*		1.44
$2s^2\,2p^2(^3P)3p$	$3p\ {}^4P^{\circ}$	½	*95476.5*	18.4	2.671
		1½	*95494.9*	38.3	1.737
		2½	*95533.2*		1.598

N I—Continued

Config.	Desig.	J	Level	Interval	Obs. g
$2s^2\,2p^2(^3P)3p$	$3p\ ^4S^\circ$	1½	*96751.7*		2.004
$2s^2\,2p^2(^3P)3p$	$3p\ ^2D^\circ$	1½ 2½	*96788.2* *96864.2*	76.0	
$2s^2\,2p^2(^3P)3p$	$3p\ ^2P^\circ$	½ 1½	*97770.1* *97805.8*	35.7	
$2s^2\,2p^2(^1D)3s$	$3s'\ ^2D$	2½ 1½	99665 99658	−7	
$2s^2\,2p^2(^3P)4s$	$4s\ ^4P$	½ 1½ 2½	103618.1 103668.1 103736.8	50.0 68.7	
$2s^2\,2p^2(^3P)4s$	$4s\ ^2P$	½ 1½	104142.2 104227.4	85.2	
$2s^2\,2p^2(^3P)3d$	$3d\ ^2P$	1½ ½	104615.4 104654.9	−39.5	
$2s^2\,2p^2(^3P)3d$	$3d\ ^4F$	1½ 2½ 3½ 4½	104665 104684 104718 104767	19 34 49	
$2s^2\,2p^2(^3P)3d$	$3d\ ^2F$	2½ 3½	104810.9 104882.7	71.8	
$2s^2\,2p^2(^3P)3d$	$3d\ ^4P$	½ 1½ 2½	104864 104890 104957	26 67	
$2s^2\,2p^2(^3P)3d$	$3d\ ^4D$	½ 1½ 2½ 3½	104987 104998 105011 105020	11 13 9	
$2s^2\,2p^2(^3P)3d$	$3d\ ^2D$	1½ 2½	105120.8 105144.3	23.5	
$2s^2\,2p^2(^3P)4p$	$4p\ ^2S^\circ$	½	*106478.6*		
$2s^2\,2p^2(^3P)4p$	$4p\ ^4D^\circ$	½ 1½ 2½ 3½	*106760.5* *106780.1* *106816.1* *106870.7*	19.6 36.0 54.6	
$2s^2\,2p^2(^3P)4p$	$4p\ ^4P^\circ$	½ 1½ 2½	*106982.7* *106998.3* *107039.0*	15.6 40.7	
$2s^2\,2p^2(^3P)4p$	$4p\ ^4S^\circ$	1½	*107447.2*		
$2s^2\,2p^2(^3P)5s$	$5s\ ^4P$	½ 1½ 2½	109813.5 109857.8 109927.9	44.3 70.1	
$2s^2\,2p^2(^3P)5s$	$5s\ ^2P$	½ 1½	110029.2 110108.5	79.3	
$2s^2\,2p^2(^3P)4d$	$4d\ ^4F$	1½ 2½ 3½ 4½	110196 110214 110248 110304	18 34 56	
$2s^2\,2p^2(^3P)4d$	$4d\ ^4D$	½ 1½ 2½ 3½	110221 110275 110288 110339	54 13 51	
$2s^2\,2p^2(^3P)4d$	$4d\ ^2P$	1½ ½	110221.7 110244.6	−22.9	
$2s^2\,2p^2(^3P)4d$	$4d\ ^2F$	2½ 3½	110311 110373	62	
$2s^2\,2p^2(^3P)4d$	$4d\ ^4P$	½ 1½ 2½	110325 110351 110403	26 52	
$2s^2\,2p^2(^3P)4d$	$4d\ ^2D$	1½ 2½	110448.3 110470.5	22.2	
$2s^2\,2p^2(^1D)3p$	$3p'\ ^2D^\circ$	1½ 2½	*110521.9* *110545.8*	23.9	
$2s^2\,2p^2(^1D)3p$	$3p'\ ^2P^\circ$	½ 1½	*112294.8* *112320.8*	26.0	
$2s^2\,2p^2(^3P)6s$	$6s\ ^4P$	½ 1½ 2½	112565.9 112610.6 112682.6	44.7 72.0	
$2s^2\,2p^2(^3P)6s$	$6s\ ^2P$	½ 1½	112735 112823	88	
$2s^2\,2p^2(^3P)5d$	$5d\ ^4F$	1½ 2½ 3½ 4½	112751? 112763? 112799 112862	12 36 63	
$2s^2\,2p^2(^3P)5d$	$5d\ ^2P$	1½ ½	112801 112816	−15	
$2s^2\,2p^2(^3P)5d$	$5d\ ^2F$	2½ 3½	112820 112890.2	70	
$2s^2\,2p^2(^3P)5d$	$5d\ ^4D$	½ 1½ 2½ 3½	 112825 112892?	67	
$2s^2\,2p^2(^3P)5d$	$5d\ ^4P$	½ 1½ 2½	112855 112874 112912	19 38	
$2s^2\,2p^2(^3P)5d$	$5d\ ^2D$	1½ 2½	112929.2 112947.5	18.3	
$2s^2\,2p^2(^3P)7s$	$7s\ ^4P$	½ 1½ 2½	114015? 114072? 114146	57 74	
$2s^2\,2p^2(^3P)7s$	$7s\ ^2P$	½ 1½	114130 114163	33	
$2s^2\,2p^2(^3P)6d$	$6d\ ^4F$	{1½ to 4½}	114160		
$2s^2\,2p^2(^3P)6d$	$6d\ ^4D$	½ 1½ 2½ 3½	 114182 114248?	66	
$2s^2\,2p^2(^3P)6d$	$6d\ ^2P$	1½ ½	114193 114209	−16	
$2s^2\,2p^2(^3P)6d$	$6d\ ^2F$	2½ 3½	114196 114275	79	
$2s^2\,2p^2(^3P)6d$	$6d\ ^2D$	1½ 2½	114232.2 114290.5	58.3	
$2s^2\,2p^2(^3P)6d$	$6d\ ^4P$	½ 1½ 2½	 114259 114274	15	
$2s^2\,2p^2(^3P)8s$	$8s\ ^4P$	½ 1½ 2½	114809 114890 114942	81 52	

N I—Continued

Config.	Desig.	J	Level	Interval	Obs. g
$2s^2 2p^2(^3P)8s$	$8s\ ^2P$	½, 1½	114950		
$2s^2 2p^2(^3P)7d$	$7d\ ^4D$	½ to 3½	114988		
$2s^2 2p^2(^3P)7d$	$7d\ ^2F$	2½, 3½	115004		
$2s^2 2p^2(^3P)7d$	$7d\ ^2P$	1½, ½	115017		
$2s^2 2p^2(^3P)7d$	$7d\ ^2D$	1½	115057. 5	42. 6	
		2½	115100. 1		
$2s^2 2p^2(^3P)7d$	$7d\ ^4P$	½, 1½, 2½	115103		
$2s^2 2p^2(^3P)9s$	$9s\ ^2P$	½, 1½	115480		
$2s^2 2p^2(^3P)9s$	$9s\ ^4P$	½ to 2½	115483		
$2s^2 2p^2(^3P)8d$	$8d\ ^4D$	½ to 3½	115524		
$2s^2 2p^2(^3P)8d$	$8d\ ^2P$	1½, ½	115530		
$2s^2 2p^2(^3P)8d$	$8d\ ^2F$	2½, 3½	115535		
$2s^2 2p^2(^3P)8d$	$8d\ ^2D$	1½	115597	25	
		2½	115622		
$2s^2 2p^2(^3P)8d$	$8d\ ^4P$	½ to 2½	115618		
$2s^2 2p^2(^3P)10s$	$10s\ ^2P$	½, 1½	115842		
$2s^2 2p^2(^3P)10s$	$10s\ ^4P$	½ to 2½	115855		
$2s^2 2p^2(^3P)9d$	$9d\ ^4D$	½ to 3½	115887		
$2s^2 2p^2(^3P)9d$	$9d\ ^2P$	1½, ½	115889		
$2s^2 2p^2(^3P)9d$	$9d\ ^2F$	2½, 3½	115902		
$2s^2 2p^2(^3P)9d$	$9d\ ^2D$	1½	115973	18	
		2½	115991		
$2s^2 2p^2(^3P)9d$	$9d\ ^4P$	½ to 2½	115990		

N I—Continued

Config.	Desig.	J	Level	Interval	Obs. g
$2s^2 2p^2(^3P)11s$	$11s\ ^2P$	½, 1½	116107		
$2s^2 2p^2(^3P)11s$	$11s\ ^4P$	½ to 2½	116124		
$2s^2 2p^2(^3P)10d$	$10d\ ^2P$	1½, ½	116155		
$2s^2 2p^2(^3P)10d$	$10d\ ^2F$	2½, 3½	116159		
$2s^2 2p^2(^3P)10d$	$10d\ ^4D$	½ to 3½	116164		
$2s^2 2p^2(^3P)10d$	$10d\ ^2D$	1½, 2½	116240		
$2s^2 2p^2(^3P)10d$	$10d\ ^4P$	½ to 2½	116259		
$2s^2 2p^2(^3P)12s$	$12s\ ^2P$	½, 1½	116305		
$2s^2 2p^2(^3P)12s$	$12s\ ^4P$	½ to 2½	116312		
$2s^2 2p^2(^3P)11d$	$11d\ ^2P$	1½, ½	116351		
$2s^2 2p^2(^3P)11d$	$11d\ ^2F$	2½, 3½	116359		
$2s^2 2p^2(^3P)11d$	$11d\ ^4D$	½ to 3½	116367		
$2s^2 2p^2(^3P)11d$	$11d\ ^2D$	1½, 2½	116436		
$2s^2 2p^2(^3P)11d$	$11d\ ^4P$	½ to 2½	116441		
$2s^2 2p^2(^3P)13s$	$13s\ ^2P$	½, 1½	116467		
$2s^2 2p^2(^3P)12d$	$12d\ ^2P$	1½, ½	116502		
$2s^2 2p^2(^3P)12d$	$12d\ ^4P$	½ to 2½	116581		
$2s^2 2p^2(^3P)12d$	$12d\ ^2D$	1½, 2½	116625		
N II ($^3P_0$)	*Limit*	------	***117345***		

October 1947.

N I OBSERVED TERMS*

Config. $1s^2+$	Observed Terms							
$2s^2\ 2p^3$	$2p^3\ ^4S^\circ$	$2p^3\ ^2P^\circ$	$2p^3\ ^2D^\circ$					
$2s\ 2p^4$		$2p^4\ ^4P$						
	$ns\ (n \geq 3)$		$np\ (n \geq 3)$			$nd\ (n \geq 3)$		
$2s^2\ 2p^2(^3P)nx$	$3\text{–}12s\ ^4P$		$3, 4p\ ^4S^\circ$	$3, 4p\ ^4P^\circ$	$3, 4p\ ^4D^\circ$	$3\text{–}12d\ ^4P$	$3\text{–}11d\ ^4D$	$3\text{–}\ 6d\ ^4F$
	$3\text{–}13s\ ^2P$		$3, 4p\ ^2S^\circ$	$3p\ ^2P^\circ$	$3p\ ^2D^\circ$	$3\text{–}12d\ ^2P$	$3\text{–}12d\ ^2D$	$3\text{–}11d\ ^2F$
$2s^2\ 2p^2(^1D)nx'$		$3s'\ ^2D$		$3p'\ ^2P^\circ$	$3p'\ ^2D^\circ$			

*For predicted terms in the spectra of the N I isoelectronic sequence, see Introduction.

N II

(C I sequence; 6 electrons) $Z=7$

Ground state $1s^2\ 2s^2\ 2p^2\ ^3P_0$

$2p^2\ ^3P_0$ 238846. 7 cm^{-1} I. P. 29.605 volts

Edlén has revised and extended the earlier analysis of this spectrum. The terms are all taken from his Monograph, except those from the $4f$ configuration, which are from his 1936 paper, and his $3s'\ ^3P$ and $5f$-terms, which he has generously furnished in a private communication.

The singlet and triplet terms are well connected by intersystem combinations but the quintets are not so connected with the others. Edlén also suggests that by analogy with C I and O III the published absolute values of the quintet terms should be decreased by about 500 cm^{-1}. This correction has been applied in the table and should diminish the uncertainty x appreciably.

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N II

Edlén	Config.	Desig.	J	Level	Interval
$2p\ ^3P_0$	$2s^2\,2p^2$	$2p^2\ ^3P$	0	0.0	
$^3P_1$			1	49.1	49.1
$^3P_2$			2	131.3	82.2
$2p\ ^1D_2$	$2s^2\,2p^2$	$2p^2\ ^1D$	2	15315.7	
$2p\ ^1S_0$	$2s^2\,2p^2$	$2p^2\ ^1S$	0	32687.1	
$2p'\ ^5S_2$	$2s\,2p^3$	$2p^3\ ^5S^\circ$	2	*47167.7+x*	
$2p'\ ^3D_3$	$2s\,2p^3$	$2p^3\ ^3D^\circ$	3	*92237.9*	
$^3D_2$			2	*92251.3*	−13.4
$^3D_1$			1	*92252.9*	−1.6
$2p'\ ^3P_{12}$	$2s\,2p^3$	$2p^3\ ^3P^\circ$	2, 1	*109218.2*	
$^3P_0$			0	*109224.8*	−6.6
$2p'\ ^1D_2$	$2s\,2p^3$	$2p^3\ ^1D^\circ$	2	*144189.1*	
$3s\ ^3P_0$	$2s^2\,2p(^2P^\circ)3s$	$3s\ ^3P^\circ$	0	*148909.37*	
$^3P_1$			1	*148940.97*	31.60
$^3P_2$			2	*149077.33*	136.36
$3s\ ^1P_1$	$2s^2\,2p(^2P^\circ)3s$	$3s\ ^1P^\circ$	1	*149188.74*	
$2p'\ ^3S_1$	$2s\,2p^3$	$2p^3\ ^3S^\circ$	1	*155129.9*	
$3p\ ^1P_1$	$2s^2\,2p(^2P^\circ)3p$	$3p\ ^1P$	1	164611.60	
$3p\ ^3D_1$	$2s^2\,2p(^2P^\circ)3p$	$3p\ ^3D$	1	166522.48	
$^3D_2$			2	166583.26	60.78
$^3D_3$			3	166679.45	96.19
$2p'\ ^1P_1$	$2s\,2p^3$	$2p^3\ ^1P^\circ$	1	*166765.7*	
$3p\ ^3S_1$	$2s^2\,2p(^2P^\circ)3p$	$3p\ ^3S$	1	168893.04	
$3p\ ^3P_0$	$2s^2\,2p(^2P^\circ)3p$	$3p\ ^3P$	0	170573.38	
$^3P_1$			1	170608.63	35.25
$^3P_2$			2	170667.00	58.37
$3p\ ^1D_2$	$2s^2\,2p(^2P^\circ)3p$	$3p\ ^1D$	2	174212.93	
$3p\ ^1S_0$	$2s^2\,2p(^2P^\circ)3p$	$3p\ ^1S$	0	178274.17	
$3d\ ^3F_2$	$2s^2\,2p(^2P^\circ)3d$	$3d\ ^3F^\circ$	2	*186512.38*	
$^3F_3$			3	*186571.80*	59.42
$^3F_4$			4	*186653.35*	81.55
$3d\ ^1D_2$	$2s^2\,2p(^2P^\circ)3d$	$3d\ ^1D^\circ$	2	*187092.20*	
$3d\ ^3D_1$	$2s^2\,2p(^2P^\circ)3d$	$3d\ ^3D^\circ$	1	*187438.34*	
$^3D_2$			2	*187462.38*	24.04
$^3D_3$			3	*187492.72*	30.34
$3d\ ^3P_2$	$2s^2\,2p(^2P^\circ)3d$	$3d\ ^3P^\circ$	2	*188858.09*	
$^3P_1$			1	*188909.89*	−51.80
$^3P_0$			0	*188937.95*	−28.06
$3d\ ^1F_3$	$2s^2\,2p(^2P^\circ)3d$	$3d\ ^1F^\circ$	3	*189336.0*	
$3d\ ^1P_1$	$2s^2\,2p(^2P^\circ)3d$	$3d\ ^1P^\circ$	1	*190121.15*	
$4s\ ^3P_0$	$2s^2\,2p(^2P^\circ)4s$	$4s\ ^3P^\circ$	0	*196541.09*	
$^3P_1$			1	*196592.88*	51.79
$^3P_2$			2	*196712.17*	119.29
$4s\ ^1P_1$	$2s^2\,2p(^2P^\circ)4s$	$4s\ ^1P^\circ$	1	*197859.28*	
$4p\ ^1P_1$	$2s^2\,2p(^2P^\circ)4p$	$4p\ ^1P$	1	202169.9	
$4p\ ^3D_1$	$2s^2\,2p(^2P^\circ)4p$	$4p\ ^3D$	1	202714.94	
$^3D_2$			2	202765.86	50.92
$^3D_3$			3	202862.06	96.20
$4p\ ^3P_0$	$2s^2\,2p(^2P^\circ)4p$	$4p\ ^3P$	0	203164.7	
$^3P_1$			1	203188.8	24.1
$^3P_2$			2	203259.7	70.9

N II

Edlén	Config.	Desig.	J	Level	Interval
$4p\ ^3S_1$	$2s^2\,2p(^2P^\circ)4p$	$4p\ ^3S$	1	203532.8	
$4p\ ^1D_2$	$2s^2\,2p(^2P^\circ)4p$	$4p\ ^1D$	2	205350.7	
$3s'\ ^5P_1$	$2s\,2p^2(^4P)3s$	$3s\ ^5P$	1	205982.1+x	
$^5P_2$			2	206038.1+x	56.0
$^5P_3$			3	206108.7+x	70.6
$4p\ ^1S_0$	$2s^2\,2p(^2P^\circ)4p$	$4p\ ^1S$	0	206327.5	
$4d\ ^3F_2$	$2s^2\,2p(^2P^\circ)4d$	$4d\ ^3F^\circ$	2	*209675.3*	
$^3F_3$			3	*209739.5*	64.2
$^3F_4$			4	*209825.3*	85.8
$4d\ ^1D_2$	$2s^2\,2p(^2P^\circ)4d$	$4d\ ^1D^\circ$	2	*209926.92*	
$4d\ ^3D_1$	$2s^2\,2p(^2P^\circ)4d$	$4d\ ^3D^\circ$	1	*210239.8*	
$^3D_2$			2	*210266.3*	26.5
$^3D_3$			3	*210301.9*	35.6
$4d\ ^3P_2$	$2s^2\,2p(^2P^\circ)4d$	$4d\ ^3P^\circ$	2	*210705.4*	
$^3P_1$			1	*210751.5*	−46.1
$^3P_0$			0	*210777.0*	−25.5
$4f\ ^1F_3$	$2s^2\,2p(^2P^\circ)4f$	$4f\ ^1F$	3	211030.90	
$4f\ ^3F_2$	$2s^2\,2p(^2P^\circ)4f$	$4f\ ^3F$	2	211033.71	
$^3F_3$			3	211057.07	23.36
$^3F_4$			4	211061.03	3.96
$4d\ ^1F_3$	$2s^2\,2p(^2P^\circ)4d$	$4d\ ^1F^\circ$	3	*211104.8*	
$4f\ ^3G_3$	$2s^2\,2p(^2P^\circ)4f$	$4f\ ^3G$	3	211288.02	
$^3G_4$			4	211295.65	7.63
$^3G_5$			5	211390.77	95.12
$4d\ ^1P_1$	$2s^2\,2p(^2P^\circ)4d$	$4d\ ^1P^\circ$	1	*211335.5*	
$4f\ ^1G_4$	$2s^2\,2p(^2P^\circ)4f$	$4f\ ^1G$	4	211402.89	
$4f\ ^3D_3$	$2s^2\,2p(^2P^\circ)4f$	$4f\ ^3D$	3	211411.25	
$^3D_2$			2	211416.20	−4.95
$^3D_1$			1	211487.28	−71.08
$4f\ ^1D_2$	$2s^2\,2p(^2P^\circ)4f$	$4f\ ^1D$	2	211491.16	
$3s'\ ^3P_0$	$2s\,2p^2(^4P)3s$	$3s\ ^3P$	0	211750.2	
$^3P_1$			1	211780.6	30.4
$^3P_2$			2	211828.8	48.2
$5s\ ^3P_0$	$2s^2\,2p(^2P^\circ)5s$	$5s\ ^3P^\circ$	0	*214212.4*	
$^3P_1$			1	*214258.2*	45.8
$^3P_2$			2	*214385.3*	127.1
$5s\ ^1P_1$	$2s^2\,2p(^2P^\circ)5s$	$5s\ ^1P^\circ$	1	*214828.0*	
	$2s^2\,2p(^2P^\circ)5d$	$5d\ ^3D^\circ$	1		
			2		
$5d\ ^3D_3$			3	*220717*	
$5f\ ^3F_2$	$2s^2\,2p(^2P^\circ)5f$	$5f\ ^3F$	2		
$^3F_3$			3	221070.2	
$^3F_4$			4	221074.3	4.1
$5d\ ^1F_3$	$2s^2\,2p(^2P^\circ)5d$	$5d\ ^1F^\circ$	3	*221137.6*	
$5f\ ^3G_3$	$2s^2\,2p(^2P^\circ)5f$	$5f\ ^3G$	3	221227.7	
$^3G_4$			4	221232.7	5.0
$^3G_5$			5	221302.2	69.5
$5f\ ^1G_4$	$2s^2\,2p(^2P^\circ)5f$	$5f\ ^1G$	4	221312.1	
$3p'\ ^5D_0$	$2s\,2p^2(^4P)3p$	$3p\ ^5D^\circ$	0	*224027.1+x*	
$^5D_1$			1	*224042.9+x*	15.8
$^5D_2$			2	*224072.3+x*	29.4
$^5D_3$			3	*224115.4+x*	43.1
$^5D_4$			4	*224169.3+x*	53.9

N II—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3p'\ ^5P_1$	$2s\ 2p^3(^4P)3p$	$3p\ ^5P^\circ$	1	225987.1+x	
$^5P_2$			2	226011.2+x	24.1
$^5P_3$			3	226055.2+x	44.0
$3p'\ ^5S_2$	$2s\ 2p^3(^4P)3p$	$3p\ ^5S^\circ$	2	230223.0+x	
	N III ($^2P^\circ_{1/2}$)	*Limit*	------	238846.7	
$3d'\ ^5F_1$	$2s\ 2p^3(^4P)3d$	$3d\ ^5F$	1	243355.5+x	
$^5F_2$			2	243371.2+x	15.7
$^5F_3$			3	243396.6+x	25.4
$^5F_4$			4	243430.2+x	33.6
$^5F_5$			5	243470.8+x	40.6
$3d'\ ^5P_3$	$2s\ 2p^3(^4P)3d$	$3d\ ^5P$	3	244737.4+x	
$^5P_2$			2	244775.9+x	−38.5
$^5P_1$			1	244802.0+x	−26.1
$3d'\ ^5D_0$	$2s\ 2p^3(^4P)3d$	$3d\ ^5D$	0	245319.8+x	
$^5D_1$			1	245323.4+x	3.6
$^5D_2$			2	245331.3+x	7.9
$^5D_3$			3	245342.9+x	11.6
$^5D_4$			4	245356.9+x	14.0

December 1947.

N II Observed g-Values

Desig.	J	Obs. g	Desig.	J	Obs. g	Desig.	J	Obs. g
$3s\ ^3P^\circ$	1	1.455	$3p\ ^3S$	1	2.015	$3d\ ^1D^\circ$	2	0.986
	2	1.502	$3p\ ^3P$	1	1.530	$3d\ ^3D^\circ$	1	0.494
$3s\ ^1P^\circ$	1	1.051		2	1.497		2	1.114
$3p\ ^1P$	1	1.005	$3p\ ^1D$	2	1.002		3	1.329
$3p\ ^3D$	1	0.494	$3d\ ^3F^\circ$	3	1.079	$3d\ ^3P^\circ$	2	1.504
	2	1.166		4	1.250		1	1.487
	3	1.330				$3d\ ^1P^\circ$	1	1.026

N II Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2\ 2p^2$	$2p^2\ ^1S$; $2p^2\ ^3P$; $2p^2\ ^1D$		
$2s\ 2p^3$	$2p^3\ ^5S^\circ$; $2p^3\ ^3S^\circ$; $2p^3\ ^3P^\circ$; $2p^3\ ^1P^\circ$; $2p^3\ ^3D^\circ$; $2p^3\ ^1D^\circ$		

Config. $1s^2+$	ns $(n\geq 3)$	np $(n\geq 3)$	nd $(n\geq 3)$	nf $(n\geq 4)$
$2s^2\ 2p(^2P^\circ)nx$	3–5s $^3P^\circ$ 3–5s $^1P^\circ$	3, 4p ^3S 3, 4p ^3P 3, 4p ^3D 3, 4p ^1S 3, 4p ^1P 3, 4p ^1D	3, 4d $^3P^\circ$ 3–5d $^3D^\circ$ 3, 4d $^3F^\circ$ 3, 4d $^1P^\circ$ 3, 4d $^1D^\circ$ 3–5d $^1F^\circ$	4f ^3D 4, 5f ^3F 4, 5f ^3G 4f ^1D 4f ^1F 4, 5f ^1G
$2s\ 2p^2(^4P)nx$	3s ^5P 3s ^3P	3p $^5S^\circ$ 3p $^5P^\circ$ 3p $^5D^\circ$	3d ^5P 3d ^5D 3d ^5F	

*For predicted terms in the spectra of the C I isolectronic sequence, see Introduction.

N III

(B I sequence; 5 electrons) Z=7

Ground state $1s^2\ 2s^2\ 2p\ ^2P_{\frac{1}{2}}^{\circ}$

$2p\ ^2P_{\frac{1}{2}}^{\circ}$ *382625.5* cm^{-1} I. P. 47.426 volts

All of the terms except those with a $4f$-electron, have been taken from Edlén's Monograph. In 1936 Edlén published a revised and extended list of $4f$-terms and the corresponding classified lines, including intersystem combinations. The observed correction to his previously published quartet terms -396.4 cm^{-1}, connecting them with the doublet terms has been incorporated into the present list.

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N III

Edlén	Config.	Desig.	J	Level	Interval
$2p\ ^2P_1$ $^2P_2$	$2s^2(^1S)2p$	$2p\ ^2P^{\circ}$	½ 1½	*0.0* *174.5*	174.5
$2p'\ ^4P_1$ $^4P_2$ $^4P_3$	$2s\ 2p^2$	$2p^2\ ^4P$	½ 1½ 2½	57192.1 57252.0 57333.2	59.9 81.2
$2p'\ ^2D_3$ $^2D_2$	$2s\ 2p^2$	$2p^2\ ^2D$	2½ 1½	101023.8 101031.5	−7.7
$2p'\ ^2S_1$	$2s\ 2p^2$	$2p^2\ ^2S$	½	131003.5	
$2p'\ ^2P_1$ $^2P_2$	$2s\ 2p^2$	$2p^2\ ^2P$	½ 1½	145876.1 145986.5	110.4
$2p''\ ^4S_2$	$2p^3$	$2p^3\ ^4S^{\circ}$	1½	*186802.3*	
$2p''\ ^2D_3$ $^2D_2$	$2p^3$	$2p^3\ ^2D^{\circ}$	2½ 1½	*203072.2* *203088.9*	−16.7
$3s\ ^2S_1$	$2s^2(^1S)3s$	$3s\ ^2S$	½	221302.4	
$2p''\ ^2P_1$ $^2P_2$	$2p^3$	$2p^3\ ^2P^{\circ}$	½ 1½	*230404.5* *230408.6*	4.1
$3p\ ^2P_1$ $^2P_2$	$2s^2(^1S)3p$	$3p\ ^2P^{\circ}$	½ 1½	*245665.7* *245701.7*	36.0
$3d\ ^2D_2$ $^2D_3$	$2s^2(^1S)3d$	$3d\ ^2D$	1½ 2½	267238.5 267244.4	5.9
$3s'\ ^4P_1$ $^4P_2$ $^4P_3$	$2s\ 2p(^3P^{\circ})3s$	$3s\ ^4P^{\circ}$	½ 1½ 2½	*287535.6* *287598.1* *287713.9*	62.5 115.8
$3s'\ ^2P_1$ $^2P_2$	$2s\ 2p(^3P^{\circ})3s$	$3s\ ^2P^{\circ}$	½ 1½	*297150.2* *297263.1*	112.9
$4s\ ^2S_1$	$2s^2(^1S)4s$	$4s\ ^2S$	½	301088.2	
$3p'\ ^2P_1$ $^2P_2$	$2s\ 2p(^3P^{\circ})3p$	$3p\ ^2P$	½ 1½	309132.6 309185.8	53.2
$3p'\ ^4D_1$ $^4D_2$ $^4D_3$ $^4D_4$	$2s\ 2p(^3P^{\circ})3p$	$3p\ ^4D$	½ 1½ 2½ 3½	309662.8 309698.3 309760.5 309856.7	35.5 62.2 96.2
$4p\ ^2P_1$ $^2P_2$	$2s^2(^1S)4p$	$4p\ ^2P^{\circ}$	½ 1½	*311691.3* *311716.1*	24.8
$3p'\ ^4S_2$	$2s\ 2p(^3P^{\circ})3p$	$3p\ ^4S$	1½	314224.0	
$3p'\ ^4P_1$ $^4P_2$ $^4P_3$	$2s\ 2p(^3P^{\circ})3p$	$3p\ ^4P$	½ 1½ 2½	317299.9 317343.4 317402.3	43.5 58.9
$4d\ ^2D_2$ $^2D_3$	$2s^2(^1S)4d$	$4d\ ^2D$	1½ 2½	317750.8 317781.8	31.0
 $4f\ ^2F_4$	$2s^2(^1S)4f$	$4f\ ^2F^{\circ}$	2½ 3½	 *320287.5*	

N III—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3p'\ ^2D_2$ $^2D_3$	$2s\,2p(^3P^\circ)3p$	$3p\ ^2D$	1½ 2½	320977.4 321065.8	88.4
$3p'\ ^2S_1$	$2s\,2p(^3P^\circ)3p$	$3p\ ^2S$	½	327056.8	
$3d'\ ^4F_2$ $^4F_3$ $^4F_4$ $^4F_5$	$2s\,2p(^3P^\circ)3d$	$3d\ ^4F^\circ$	1½ 2½ 3½ 4½	*330238.4* *330273.5* *330325.3* *330396.7*	35.1 51.8 71.4
$3d'\ ^4D_1$ $^4D_2$ $^4D_3$ $^4D_4$	$2s\,2p(^3P^\circ)3d$	$3d\ ^4D^\circ$	½ 1½ 2½ 3½	*332796.6* *332810.0* *332832.0* *332860.3*	13.4 22.0 28.3
$5s\ ^2S_1$	$2s^2(^1S)5s$	$5s\ ^2S$	½	333713.1	
$3d'\ ^2D_2$ $^2D_3$	$2s\,2p(^3P^\circ)3d$	$3d\ ^2D^\circ$	1½ 2½	*334542.2* *334568.9*	26.7
$3d'\ ^4P_3$ $^4P_2$ $^4P_1$	$2s\,2p(^3P^\circ)3d$	$3d\ ^4P^\circ$	2½ 1½ ½	*336213.4* *336268.0* *336303.1*	−54.6 −35.1
$3d'\ ^2F_3$ $^2F_4$	$2s\,2p(^3P^\circ)3d$	$3d\ ^2F^\circ$	2½ 3½	*339744.4* *339855.7*	111.3
$5d\ ^2D_2$ $^2D_3$	$2s^2(^1S)5d$	$5d\ ^2D$	1½ 2½	341946.2 341947.9	1.7
$3d'\ ^2P_2$ $^2P_1$	$2s\,2p(^3P^\circ)3d$	$3d\ ^2P^\circ$	1½ ½	*342693.0* *342763.7*	−70.7
 $5f\ ^2F_4$	$2s^2(^1S)5f$	$5f\ ^2F^\circ$	2½ 3½	 *342752.0*	
$5g\ ^2G$	$2s^2(^1S)5g$	$5g\ ^2G$	{3½ {4½	}343116	
 $6d\ ^2D_3$	$2s^2(^1S)6d$	$6d\ ^2D$	1½ 2½	 354517	
 $6f\ ^2F_4$	$2s^2(^1S)6f$	$6f\ ^2F^\circ$	2½ 3½	 *354955.7*	
$6g\ ^2G$	$2s^2(^1S)6g$	$6g\ ^2G$	{3½ {4½	}355214	
$4s'\ ^4P_1$ $^4P_2$ $^4P_3$	$2s\,2p(^3P^\circ)4s$	$4s\ ^4P^\circ$	½ 1½ 2½	*368525.6* *368588.3* *368704.8*	62.7 116.5
$\overline{3p}'\ ^2D_2$ $^2D_3$	$2s\,2p(^1P^\circ)3p$	$3p'\ ^2D$	1½ 2½	373342 373376	34
$4p'\ ^2P_1$ $^2P_2$	$2s\,2p(^3P^\circ)4p$	$4p\ ^2P$	½ 1½	374747.4 374805.3	57.9
$4p'\ ^4D_1$ $^4D_2$ $^4D_3$ $^4D_4$	$2s\,2p(^3P^\circ)4p$	$4p\ ^4D$	½ 1½ 2½ 3½	376756.6 376803.3 376863.8 376953.3	46.7 60.5 89.5
$\overline{3p}'\ ^2P_1$ $^2P_2$	$2s\,2p(^1P^\circ)3p$	$3p'\ ^2P$	½ 1½	377591 377608	17
$4p'\ ^2D_2$ $^2D_3$	$2s\,2p(^3P^\circ)4p$	$4p\ ^2D$	1½ 2½	377883.7 377970.8	87.1
$4p'\ ^4S_2$	$2s\,2p(^3P^\circ)4p$	$4p\ ^4S$	1½	378440.5	
$4p'\ ^4P_1$ $^4P_2$ $^4P_3$	$2s\,2p(^3P^\circ)4p$	$4p\ ^4P$	½ 1½ 2½	379307.3 379352.1 379405.0	44.8 52.9
	N IV ($^1S_0$)	*Limit*	------	*382625.5*	
 $4d'\ ^4F_3$ $^4F_4$ $^4F_5$	$2s\,2p(^3P^\circ)4d$	$4d\ ^4F^\circ$	1½ 2½ 3½ 4½	 *384016* *384065* *384139*	49 74
$4d'\ ^2D$	$2s\,2p(^3P^\circ)4d$	$4d\ ^2D^\circ$	{1½ {2½	}*385126*	
 $4d'\ ^4D_2$ $^4D_3$ $^4D_4$	$2s\,2p(^3P^\circ)4d$	$4d\ ^4D^\circ$	½ 1½ 2½ 3½	 *385296* *385323* *385352*	27 29
$4d'\ ^4P_3$	$2s\,2p(^3P^\circ)4d$	$4d\ ^4P^\circ$	2½ 1½ ½	*386246*	
$4f'\ ^2F_3$ $^2F_4$	$2s\,2p(^3P^\circ)4f$	$4f\ ^2F$	2½ 3½	386953.4 386974	21
 $4f'\ ^4F_3$ $^4F_4$ $^4F_5$	$2s\,2p(^3P^\circ)4f$	$4f\ ^4F$	1½ 2½ 3½ 4½	 387000.8 387010.3 387042.3	9.5 32.0
$4d'\ ^2F_3$ $^2F_4$	$2s\,2p(^3P^\circ)4d$	$4d\ ^2F^\circ$	2½ 3½	*387728.7* *387811.5*	82.8
$4f'\ ^4G_3$ $^4G_4$ $^4G_5$ $^4G_6$	$2s\,2p(^3P^\circ)4f$	$4f\ ^4G$	2½ 3½ 4½ 5½	388039.2 388082.9 388134.8 388198	43.7 51.9 63
$4f'\ ^2G_4$ $^2G_5$	$2s\,2p(^3P^\circ)4f$	$4f\ ^2G$	3½ 4½	388190.3 388290.0	99.7
$4f'\ ^4D_4$ $^4D_3$ $^4D_2$ $^4D_1$	$2s\,2p(^3P^\circ)4f$	$4f\ ^4D$	3½ 2½ 1½ ½	388273.4 388310.9 388359.2 388386.6	−37.5 −48.3 −27.4
$4f'\ ^2D_3$ $^2D_2$	$2s\,2p(^3P^\circ)4f$	$4f\ ^2D$	2½ 1½	388376.9 388442.4	−65.5
$\overline{3d}'\ ^2D_2$ $^2D_3$	$2s\,2p(^1P^\circ)3d$	$3d'\ ^2D^\circ$	1½ 2½	*396574.9* *396584.8*	9.9
   $5d'\ ^4D_4$	$2s\,2p(^3P^\circ)5d$	$5d\ ^4D^\circ$	½ 1½ 2½ 3½	 *409017*	

June 1946.

N III OBSERVED TERMS*

Config. $1s^2+$	Observed Terms		
$2s^2\ (^1S)2p$	$2p\ ^2P^\circ$		
$2s\ 2p^2$	$2p^2\ ^4P$ $2p^2\ ^2S$ $2p^2\ ^2P$ $2p^2\ ^2D$		
$2p^3$	$2p^3\ ^4S^\circ$ $2p^3\ ^2P^\circ$ $2p^3\ ^2D^\circ$		
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$
$2s^2\ (^1S)nx$	$3\text{–}5s\ ^2S$	$3,4p\ ^2P^\circ$	$3\text{–}6d\ ^2D$
$2s\ 2p(^3P^\circ)nx$	$3,4s\ ^4P^\circ$ $3s\ ^2P^\circ$	$3,4p\ ^4S$ $3,4p\ ^4P$ $3,4p\ ^4D$ $3p\ ^2S$ $3,4p\ ^2P$ $3,4p\ ^2D$	$3,4d\ ^4P^\circ$ $3\text{–}5d\ ^4D^\circ$ $3,4d\ ^4F^\circ$ $3d\ ^2P^\circ$ $3,4d\ ^2D^\circ$ $3,4d\ ^2F^\circ$
$2s\ 2p(^1P^\circ)nx'$		$3p'\ ^2P$ $3p'\ ^2D$	$3d'\ ^2D^\circ$
	$nf\ (n\geq 4)$	$ng\ (n\geq 5)$	
$2s^2\ (^1S)nx$	$4\text{–}6f\ ^2F^\circ$	$5,6g\ ^2G$	
$2s\ 2p(^3P^\circ)nx$	$4f\ ^4D$ $4f\ ^4F$ $4f\ ^4G$ $4f\ ^2D$ $4f\ ^2F$ $4f\ ^2G$		

*For predicted terms in the spectra of the B I isoelectronic sequence, see Introduction.

N IV

(Be I sequence; 4 electrons) $Z=7$

Ground state $1s^2\ 2s^2\ ^1S_0$

$2s^2\ ^1S_0$ **624851** cm^{-1} I. P. 77.450 volts

The terms are from Edlén's papers. The absolute values of the singlet terms are uncertain, since only two members of the ^1D-series have been observed. No intersystem combinations have been found. By analogy with N III, Edlén (1936) estimates that $2s^2\ ^1S_0-2p\ ^3P_1^\circ=67200$ cm^{-1}, which gives the absolute value of $2s^2\ ^1S_0$ as 624851 cm^{-1} instead of the earlier value 624499 cm^{-1}. The relative uncertainty x, therefore probably does not exceed ± 300 cm^{-1}.

The terms $4p\ ^3P^\circ$, $4f\ ^3F^\circ$, $5g\ ^3G$, and $3d\ ^3F^\circ$ are from the 1936 reference. Edlén obtains the $4f\ ^3F^\circ$ term by assuming that $5g\ ^3G$ is hydrogen-like (absolute value 70500 cm^{-1}) and adopting Freeman's identification of the $4f\ ^3F^\circ-5g\ ^3G$ group of lines. The listed value of $5g\ ^3G$ has been adjusted to fit Edlén's adopted value of $4f\ ^3F^\circ$.

The estimated value of $3d\ ^3F^\circ$ is included in the table in brackets.

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N IV

Edlén	Config.	Desig.	J	Level	Interval
2s $^1S_0$	$2s^2$	$2s^2\ ^1S$	0	0	
2p $^3P_0$ $^3P_1$ $^3P_2$	$2s(^2S)2p$	$2p\ ^3P°$	0 1 2	*67136.4+x* *67199.6+x* *67343.8+x*	63.2 144.2
2p $^1P_1$	$2s(^2S)2p$	$2p\ ^1P°$	1	*130695*	
2p′ $^3P_0$ $^3P_1$ $^3P_2$	$2p^2$	$2p^2\ ^3P$	0 1 2	175463.5+x 175536.7+x 175661.5+x	73.2 124.8
2p′ $^1D_2$	$2p^2$	$2p^2\ ^1D$	2	188885	
2p′ $^1S_0$	$2p^2$	$2p^2\ ^1S$	0	235370	
3s $^3S_1$	$2s(^2S)3s$	$3s\ ^3S$	1	377206+x	
3s $^1S_0$	$2s(^2S)3s$	$3s\ ^1S$	0	388858	
3p $^1P_1$	$2s(^2S)3p$	$3p\ ^1P°$	1	*404521*	
3p $^3P_0$ $^3P_1$ $^3P_2$	$2s(^2S)3p$	$3p\ ^3P°$	0 1 2	*405893.2+x* *405909.0+x* *405944.4+x*	15.8 35.4
3d $^3D_1$ $^3D_2$ $^3D_3$	$2s(^2S)3d$	$3d\ ^3D$	1 2 3	419967.8+x 419971.3+x 419979.4+x	3.5 8.1
3d $^1D_2$	$2s(^2S)3d$	$3d\ ^1D$	2	429158	
3s′ $^3P_0$ $^3P_1$ $^3P_2$	$2p(^2P°)3s$	$3s\ ^3P°$	0 1 2	*465223.0+x* *465300.6+x* *465463.4+x*	77.6 162.8
3s′ $^1P_1$	$2p(^2P°)3s$	$3s\ ^1P°$	1	*473032*	
3p′ $^1P_1$	$2p(^2P°)3p$	$3p\ ^1P$	1	480880	
 3p′ $^3D_2$ $^3D_3$	$2p(^2P°)3p$	$3p\ ^3D$	1 2 3	 484394 +x 484525 +x	131
3p′ $^3S_1$	$2p(^2P°)3p$	$3p\ ^3S$	1	487542 +x	
 3p′ $^3P_1$ $^3P_2$	$2p(^2P°)3p$	$3p\ ^3P$	0 1 2	 494240 +x 494338 +x	98
3d′ $^1D_2$	$2p(^2P°)3d$	$3d\ ^1D°$	2	*498315*	
3p′ $^1D_2$	$2p(^2P°)3p$	$3p\ ^1D$	2	499708	

N IV

Edlén	Config.	Desig.	J	Level	Interval
3d′ ^3F	$2p(^2P°)3d$	$3d\ ^3F°$	2, 3, 4	*[499851]* +x	
4p ^3P	$2s(^2S)4p$	$4p\ ^3P°$	0, 1, 2	*503625* +x	
3d′ $^3D_1$ $^3D_2$ $^3D_3$	$2p(^2P°)3d$	$3d\ ^3D°$	1 2 3	*505487* +x *505518* +x *505561* +x	31 43
3d′ $^1F_3$	$2p(^2P°)3d$	$3d\ ^1F°$	3	*506292*	
4p $^1P_1$	$2s(^2S)4p$	$4p\ ^1P°$	1	*507022*	
  4d $^3D_3$	$2s(^2S)4d$	$4d\ ^3D$	1 2 3	 511384 +x	
3d′ $^3P_2$ $^3P_1$	$2p(^2P°)3d$	$3d\ ^3P°$	2 1 0	*511440* +x *511493* +x	−53
4d $^1D_2$	$2s(^2S)4d$	$4d\ ^1D$	2	514638	
4f $^3F_2$ $^3F_3$ $^3F_4$	$2s(^2S)4f$	$4f\ ^3F°$	2 3 4	*516631* +x *516639* +x *516650* +x	8 11
3d′ $^1P_1$	$2p(^2P°)3d$	$3d\ ^1P°$	1	*519414*	
4f $^1F_3$	$2s(^2S)4f$	$4f\ ^1F°$	3	*521868*	
5p $^1P_1$	$2s(^2S)5p$	$5p\ ^1P°$	1	*550218*	
  5d $^3D_3$	$2s(^2S)5d$	$5d\ ^3D$	1 2 3	 552731 +x	
5g ^3G	$2s(^2S)5g$	$5g\ ^3G$	3, 4, 5	554419 +x	
  6d $^3D_3$	$2s(^2S)6d$	$6d\ ^3D$	1 2 3	 574940 +x	
4p′ $^1D_2$	$2p(^2P°)4p$	$4p\ ^1D$	2	591043	
4d′ $^3D_{1,2}$ $^3D_3$	$2p(^2P°)4d$	$4d\ ^3D°$	1, 2 3	*593665* +x *593704* +x	39
	N v ($^2S_{1/2}$)	*Limit*	------	624851	
  5d′ $^3D_3$	$2p(^2P°)5d$	$5d\ ^3D°$	1 2 3	 *634198* +x	

May 1946.

N IV OBSERVED TERMS*

Config. $1s^2+$	Observed Terms				
$2s^2$	$2s^2\ ^1S$				
$2s(^2S)2p$	$2p\ ^3P^\circ$ $2p\ ^1P^\circ$				
$2p^2$	$2p^2\ ^1S$ $2p^2\ ^3P$ $2p^2\ ^1D$				
	ns ($n\geq3$)	np ($n\geq3$)	nd ($n\geq3$)	nf ($n\geq4$)	ng ($n\geq5$)
$2s(^2S)nx$	$3s\ ^3S$ $3s\ ^1S$	$3, 4p\ ^3P^\circ$ $3\text{–}5p\ ^1P^\circ$	$3\text{–}6d\ ^3D$ $3, 4d\ ^1D$	$4f\ ^3F^\circ$ $4f\ ^1F^\circ$	$5g\ ^3G$
$2p(^2P^\circ)nx$	$3s\ ^3P^\circ$ $3s\ ^1P^\circ$	$3p\ ^3S$ $3p\ ^3P$ $3p\ ^1P$ $3p\ ^3D$ $3, 4p\ ^1D$	$3d\ ^3P^\circ$ $3d\ ^1P^\circ$ $3\text{–}5d\ ^3D^\circ$ $3d\ ^1D^\circ$ $3d\ ^1F^\circ$		

*For predicted terms in the spectra of the Be I isoelectronic sequence, see Introduction.

N V

(Li I sequence; 3 electrons) $Z=7$

Ground state $1s^2\ 2s\ ^2S_{1/2}$

$2s\ ^2S_{1/2}$ 789532.9 cm^{-1} I. P. 97.863 volts

Both Edlén and Cady have published analyses of this spectrum. Edlén has recently extended the earlier work and has generously furnished his revised term list in manuscript form. The observed term values in the table are from this unpublished list.

Edlén's extrapolated intervals and the term values for higher series members based on his calculations from the series formula are entered in brackets in the table. These have been taken from his 1933 and 1934 papers.

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N V

Edlén	Config.	Desig.	*J*	Level	Interval
$2s\ ^2S_1$	$2s$	$2s\ ^2S$	½	0.0	
$2p\ ^2P_1$	$2p$	$2p\ ^2P^\circ$	½	*80464.9*	258.4
$^2P_2$			1½	*80723.3*	
$3s\ ^2S_1$	$3s$	$3s\ ^2S$	½	456134	
$3p\ ^2P_1$	$3p$	$3p\ ^2P^\circ$	½	*477777.2*	74.2
$^2P_2$			1½	*477851.4*	
$3d\ ^2D_2$	$3d$	$3d\ ^2D$	1½	484403	[24]
$^2D_3$			2½	484427	
$4s\ ^2S_1$	$4s$	$4s\ ^2S$	½	606337	
$4p\ ^2P_2$	$4p$	$4p\ ^2P^\circ$	{½, 1½}	*615150*	[32]
$4d\ ^2D_3$	$4d$	$4d\ ^2D$	{1½, 2½}	617905	[10]
	$5s$	$5s\ ^2S$	½	673882	
$5p\ ^2P_2$	$5p$	$5p\ ^2P^\circ$	{½, 1½}	*678297*	[16]
$5d\ ^2D_3$	$5d$	$5d\ ^2D$	{1½, 2½}	679725	[5]
6S	$6s$	$6s\ ^2S$	½	[709947]	
$6p\ ^2P$	$6p$	$6p\ ^2P^\circ$	{½, 1½}	*712464*	
$6d\ ^2D$	$6d$	$6d\ ^2D$	{1½, 2½}	713289	
6F	$6f$	$6f\ ^2F^\circ$	{2½, 3½}	[*713327*]	
6GH	$6g$, $6h$	$6g\ ^2G$, etc.	{3½ to 5½}	[713335]	
7S	$7s$	$7s\ ^2S$	½	[731432]	
7P	$7p$	$7p\ ^2P^\circ$	{½, 1½}	*732993*	
7D	$7d$	$7d\ ^2D$	{1½, 2½}	[733516]	
7F	$7f$	$7f\ ^2F^\circ$	{2½, 3½}	[*733547*]	
7GHI	$7g$, etc.	$7g\ ^2G$, etc.	{3½ to 6½}	[733552]	
8S	$8s$	$8s\ ^2S$	½	[745260]	
8P	$8p$	$8p\ ^2P^\circ$	{½, 1½}	[*746311*]	
8D	$8d$	$8d\ ^2D$	{1½, 2½}	[746649]	
8F	$8f$	$8f\ ^2F^\circ$	{2½, 3½}	[*746670*]	
8GHIK	$8g$, etc.	$8g\ ^2G$, etc.	{3½ to 7½}	[746674]	
	N VI ($^1S_0$)	*Limit*	------	789532.9	

September 1947.

N VI

(He I sequence; 2 electrons) $Z=7$

Ground state $1s^2\ ^1S_0$

$1s^2\ ^1S_0$ **4452800± 500cm⁻¹.** I. P. 551.925±0.062 volts

Tyrén has observed the first three members of the singlet series. They are in the region from 23 A to 28 A. He lists also one intersystem combination—a line at 29.084 A classified as $1s^2\ ^1S_0-2p\ ^3P_1^\circ$. His unit, 10^3 cm^{-1}, has here been changed to cm^{-1}.

Edlén has generously furnished his unpublished manuscript containing absolute values of the triplet terms extrapolated along the He I isoelectronic sequence. The relative positions of the singlet and triplet terms thus determined confirm the intersystem combination reported by Tyrén. The $2s\ ^3S-2p\ ^3P^\circ$ combination has apparently not been observed, but Edlén regards the extrapolation from the irregular doublet law as very reliable. Brackets are used in the table to indicate extrapolated values not yet confirmed by observation.

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N VI

Config.	Desig.	J	Level	Interval
$1s^2$	$1s^2\ ^1S$	0	0	
$1s\,2s$	$2s\ ^3S$	1	[3385890]	
$1s\,2p$	$2p\ ^3P^\circ$	0 1 2	[3438270] 3438280 [3438570]	[10] [290]
$1s\,2p$	$2p\ ^1P^\circ$	1	3473790	
$1s\,3p$	$3p\ ^1P^\circ$	1	4016390	
$1s\,4p$	$4p\ ^1P^\circ$	1	4206810	
N VII ($^2S_{½}$)	*Limit*		4452800	

September 1947.

N VII

(H I sequence; 1 electron) $Z=7$

Ground state $1s\ ^2S_{½}$

$1s\ ^2S_{½}$ cm^{-1} I. P. volts

Tyrén has observed the Lyman line $1s\ ^2S-2p\ ^2P^\circ$. The calculated position of this line 24.779 A, has been used to obtain the listed value of the $2p\ ^2P^\circ$ term.

REFERENCE

F. Tyrén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **12**. No. 1, 24 (1940). (C L)

N VII

Config.	Desig.	J	Level
$1s$	$1s\ ^2S$	½	0
$2p$	$2p\ ^2P^\circ$	½, 1½	4035675

November 1946.

OXYGEN

O I

8 electrons $Z=8$

Ground state $1s^2\,2s^2\,2p^4\ {}^3P_2$

$2p^4\ {}^3P_2$ **109836.7** cm^{-1} I. P. 13.614 volts

Edlén has published a detailed analysis of this spectrum in which he has revised and extended the earlier work by others. The terms have all been taken from his paper. For the higher series members not included in his main term table, $ns\ {}^5S^\circ$ and $ns\ {}^3S^\circ$ ($n=8$ to 11), and $nd\ {}^5D^\circ$ and $nd\ {}^3D^\circ$ ($n=8$ to 10) the observed values taken from his discussion of the series formulas (p. 15), in which he compares observed and calculated values, are listed below.

Two terms not derived from observed lines are entered in brackets: $11s\ {}^5S^\circ$, which is calculated from the series formula and $2s\,2p^5\ {}^1P^\circ$, which is extrapolated.

Intersystem combinations connect the terms of the singlet, triplet, and quintet systems.

Kiess and Shortley have observed g values for four levels as follows:

Desig.	Obs. g
$3s\ {}^5S^\circ_2$	1.999
$3p\ {}^5P_1$	2.506
${}^5P_2$	1.836
${}^5P_3$	1.666

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O I

Config.	Desig.	J	Level	Interval
$2s^2\,2p^4$	$2p^4\ {}^3P$	2	0.0	−158.5
		1	158.5	−68.0
		0	226.5	
$2s^2\,2p^4$	$2p^4\ {}^1D$	2	$15867.\cancel{7}9$	
$2s^2\,2p^4$	$2p^4\ {}^1S$	0	33792.4	
$2s^2\,2p^3(^4S^\circ)3s$	$3s\ {}^5S^\circ$	2	*73767.81*	
$2s^2\,2p^3(^4S^\circ)3s$	$3s\ {}^3S^\circ$	1	*76794.69*	
$2s^2\,2p^3(^4S^\circ)3p$	$3p\ {}^5P$	1	86625.35	2.02
		2	86627.37	3.67
		3	86631.04	
$2s^2\,2p^3(^4S^\circ)3p$	$3p\ {}^3P$	2	88630.84	0.54
		1	88630.30	−0.70
		0	88631.00	
$2s^2\,2p^3(^4S^\circ)4s$	$4s\ {}^5S^\circ$	2	*95476.43*	

O I

Config.	Desig.	J	Level	Interval
$2s^2\,2p^3(^4S^\circ)4s$	$4s\ {}^3S^\circ$	1	*96225.5*	
$2s^2\,2p^3(^4S^\circ)3d$	$3d\ {}^5D^\circ$	4	*97420.24*	−0.13
		3, 2	*97420.37*	−0.13
		2, 1, 0	*97420.50*	
$2s^2\,2p^3(^4S^\circ)3d$	$3d\ {}^3D^\circ$	3, 2, 1	*97488.14*	
$2s^2\,2p^3(^4S^\circ)4p$	$4p\ {}^5P$	1	99092.64	0.67
		2	99093.31	1.21
		3	99094.52	
$2s^2\,2p^3(^4S^\circ)4p$	$4p\ {}^3P$	2, 1, 0	99680.4	
$2s^2\,2p^3(^2D^\circ)3s$	$3s'\ {}^3D^\circ$	3	*101135.04*	−12.17
		2	*101147.21*	−7.89
		1	*101155.10*	
$2s^2\,2p^3(^4S^\circ)5s$	$5s\ {}^5S^\circ$	2	*102116.21*	
$2s^2\,2p^3(^4S^\circ)5s$	$5s\ {}^3S^\circ$	1	*102411.65*	

O I—Continued

Config.	Desig.	J	Level	Interval
$2s^2\,2p^3(^2D^\circ)3s$	$3s'\ ^1D^\circ$	2	*102661.63*	
$2s^2\,2p^3(^4S^\circ)4d$	$4d\ ^5D^\circ$	4 3 2 1 0	*102865.09*	
$2s^2\,2p^3(^4S^\circ)4d$	$4d\ ^3D^\circ$	3, 2, 1	*102908.14*	
$2s^2\,2p^3(^4S^\circ)5p$	$5p\ ^3P$	2, 1, 0	103869.4	
$2s^2\,2p^3(^4S^\circ)6s$	$6s\ ^5S^\circ$	2	*105019.0*	
$2s^2\,2p^3(^4S^\circ)6s$	$6s\ ^3S^\circ$	1	*105164.90*	
$2s^2\,2p^3(^4S^\circ)5d$	$5d\ ^5D^\circ$	4 to 0	*105385.3*	
$2s^2\,2p^3(^4S^\circ)5d$	$5d\ ^3D^\circ$	3, 2, 1	*105408.58*	
$2s^2\,2p^3(^4S^\circ)6p$	$6p\ ^3P$	2, 1, 0	105911.3	
$2s^2\,2p^3(^4S^\circ)7s$	$7s\ ^5S^\circ$	2	*106545.1*	
$2s^2\,2p^3(^4S^\circ)7s$	$7s\ ^3S^\circ$	1	*106627.9*	
$2s^2\,2p^3(^4S^\circ)6d$	$6d\ ^5D^\circ$	4 to 0	*106751.2*	
$2s^2\,2p^3(^4S^\circ)6d$	$6d\ ^3D^\circ$	3, 2, 1	*106765.8*	
$2s^2\,2p^3(^4S^\circ)8s$	$8s\ ^5S^\circ$	2	*107445.4*	
$2s^2\,2p^3(^4S^\circ)8s$	$8s\ ^3S^\circ$	1	*107497.1*	
$2s^2\,2p^3(^4S^\circ)7d$	$7d\ ^5D^\circ$	4 to 0	*107573.1*	
$2s^2\,2p^3(^4S^\circ)7d$	$7d\ ^3D^\circ$	3, 2, 1	*107582.7*	
$2s^2\,2p^3(^4S^\circ)9s$	$9s\ ^5S^\circ$	2	*108021.4*	
$2s^2\,2p^3(^4S^\circ)9s$	$9s\ ^3S^\circ$	1	*108057.6*	
$2s^2\,2p^3(^4S^\circ)8d$	$8d\ ^5D^\circ$	4 to 0	*108105.7*	
$2s^2\,2p^3(^4S^\circ)8d$	$8d\ ^3D^\circ$	3, 2, 1	*108116.6*	
$2s^2\,2p^3(^4S^\circ)10s$	$10s\ ^5S^\circ$	2	*108412.0*	
$2s^2\,2p^3(^4S^\circ)10s$	$10s\ ^3S^\circ$	1	*108436.1*	
$2s^2\,2p^3(^4S^\circ)9d$	$9d\ ^5D^\circ$	4 to 0	*108470.2*	
$2s^2\,2p^3(^4S^\circ)9d$	$9d\ ^3D^\circ$	3, 2, 1	*108477.8*	
$2s^2\,2p^3(^4S^\circ)11s$	$11s\ ^5S^\circ$	2	[*108688.4*]	
$2s^2\,2p^3(^4S^\circ)11s$	$11s\ ^3S^\circ$	1	*108707.3*	
$2s^2\,2p^3(^4S^\circ)10d$	$10d\ ^5D^\circ$	4 to 0	*108731.5*	
$2s^2\,2p^3(^4S^\circ)10d$	$10d\ ^3D^\circ$	3, 2, 1	*108734.4*	
O II ($^4S^\circ_{1\frac{1}{2}}$)	*Limit*	--------	109836.7	
$2s^2\,2p^3(^2D^\circ)3p$	$3p'\ ^3D$	3 2 1	113294.42 113294.55 113298.01	−0.13 −3.46
$2s^2\,2p^3(^2D^\circ)3p$	$3p'\ ^3F$	4 3 2	113714.06 113721.06 113726.81	−7.00 −5.75
$2s^2\,2p^3(^2P^\circ)3s$	$3s''\ ^3P^\circ$	2 1 0	*113910.20* *113920.63* *113926.80*	−10.43 −6.17
$2s^2\,2p^3(^2D^\circ)3p$	$3p'\ ^1F$	3	113995.81	
$2s^2\,2p^3(^2P^\circ)3s$	$3s''\ ^1P^\circ$	1	*115918.30*	

O I—Continued

Config.	Desig.	J	Level	Interval
$2s^2\,2p^3(^2D^\circ)3p$	$3p'\ ^1D$	2	116630.51	
$2s^2\,2p^3(^2D^\circ)4s$	$4s'\ ^1D^\circ$	2	*122798.7*	
$2s^2\,2p^3(^2D^\circ)3d$	$3d'\ ^3P^\circ$	2 1 0	*123296.6* *123355.2* *123386.9*	−58.6 −31.7
$2s^2\,2p^3(^2D^\circ)3d$	$3d'\ ^3F^\circ$	4 3 2	*124213.18*	
$2s^2\,2p^3(^2D^\circ)3d$	$3d'\ ^1G^\circ$	4	*124238.21*	
$2s^2\,2p^3(^2D^\circ)3d$	$3d'\ ^3G^\circ$	5 4 3	*124239.66* *124258.37* *124252.52*	−18.71 5.85
$2s^2\,2p^3(^2D^\circ)3d$	$3d'\ ^1F^\circ$	3	*124326.32*	
$2s^2\,2p^3(^2D^\circ)4p$	$4p'\ ^3D$	3 2 1	125774.51 125782.09 125787.14	−7.58 −5.05
$2s\,2p^5$	$2p^5\ ^3P^\circ$	2 1 0	*126266.48* *126339.92* *126383.44*	−73.44 −43.52
$2s^2\,2p^3(^2P^\circ)3p$	$3p''\ ^3D$	3 2 1	127281.85 127287.62 127290.93	−5.77 −3.31
$2s^2\,2p^3(^2P^\circ)3p$	$3p''\ ^1P$	1	127667.85	
$2s^2\,2p^3(^2P^\circ)3p$	$3p''\ ^1D$	2	128595.02	
$2s^2\,2p^3(^2D^\circ)5s$	$5s'\ ^1D^\circ$	2	*129134* ±	
$2s^2\,2p^3(^2D^\circ)4d$	$4d'\ ^3F^\circ$	4 3 2	*129666.55*	
$2s^2\,2p^3(^2D^\circ)4d$	$4d'\ ^1G^\circ$	4	*129679.49*	
$2s^2\,2p^3(^2D^\circ)4d$	$4d'\ ^3G^\circ$	5 4 3	*129680.14* *129699.16* *129693.08*	−19.02 6.08
$2s^2\,2p^3(^2D^\circ)4d$	$4d'\ ^1F^\circ$	3	*129736.60*	
$2s^2\,2p^3(^2D^\circ)4d$	$4d'\ ^3P^\circ$	2 1 0	*129969.60* *129979.04* *129984.15*	−9.44 −5.11
$2s^2\,2p^3(^2P^\circ)3p$	$3p''\ ^1S$	0	130943.21	
$2s^2\,2p^3(^2D^\circ)6s$	$6s'\ ^1D^\circ$	2	*131927* ±	
$2s^2\,2p^3(^2D^\circ)5d$	$5d'\ ^3F^\circ$	4 3 2	*132190.7* ±	
$2s^2\,2p^3(^2D^\circ)5d$	$5d'\ ^1G^\circ$	4	*132197.6* ±	
$2s^2\,2p^3(^2D^\circ)5d$	$5d'\ ^3G^\circ$	5 4 3	*132198.1* *132217.8*	−19.7
$2s^2\,2p^3(^2D^\circ)5d$	$5d'\ ^3P^\circ$	2, 1 0	*132310* ±	
$2s^2\,2p^3(^2D^\circ)7s$	$7s'\ ^1D^\circ$	2	*133413* ±	
$2s^2\,2p^3(^2D^\circ)6d$	$6d'\ ^3P^\circ$	2, 1 0	*133618* ±	
$2s\,2p^5$	$2p^5\ ^1P^\circ$	1	[*189837*]	

August 1947.

O I Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2\,2p^4$	$2p^4\ ^3P$ $2p^4\ ^1S$ $2p^4\ ^1D$		
$2s\,2p^5$	$2p^5\ ^3P^\circ$		
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$
$2s^2\,2p^3(^4S^\circ)nx$	$3\text{–}10s\ ^5S^\circ$ $3\text{–}11s\ ^3S^\circ$	$3, 4p\ ^5P$ $3\text{–}6p\ ^3P$	$3\text{–}10d\ ^5D^\circ$ $3\text{–}10d\ ^3D^\circ$
$2s^2\,2p^3(^2D^\circ)nx'$	$3s'\ ^3D^\circ$ $3\text{–}7s'\ ^1D^\circ$	$3, 4p'\ ^3D$ $3p'\ ^3F$ $3p'\ ^1D$ $3p'\ ^1F$	$3\text{–}6d'\ ^3P^\circ$ $3\text{–}5d'\ ^3F^\circ$ $3\text{–}5d'\ ^3G^\circ$ $3, 4d'\ ^1F^\circ$ $3\text{–}5d'\ ^1G^\circ$
$2s^2\,2p^3(^2P^\circ)nx''$	$3s''\ ^3P^\circ$ $3s''\ ^1P^\circ$	$3p''\ ^1S$ $3p''\ ^1P$ $3p''\ ^3D$ $3p''\ ^1D$	

*For predicted terms in the spectra of the O I isoelectronic sequence, see Introduction.

O II

(N I sequence; 7 electrons) $Z=8$

Ground state $1s^2\,2s^2\,2p^3\ ^4S^\circ_{1\frac{1}{2}}$

$2p^3\ ^4S^\circ_{1\frac{1}{2}}$ ***283550.9*** cm^{-1} I. P. 35.146 volts

The terms are from Edlén's publications. He has summarized the earlier work on analysis by others and extended it by his observations in the far ultraviolet.

Edlén states that a number of the $5f$-terms are very uncertain. These are followed by a "?" in the table. His estimated values of three terms from the (^1S) limit in O III are given in brackets.

Mihul lists the observed Zeeman effects for 111 lines, which in general agree well with the theoretical patterns for the adopted classifications. From his data a number of g-values could be calculated, but many of the observed patterns are unresolved.

Although the analysis of O II is fairly complete, the measures by different observers are discordant. The term values could be greatly improved by a set of homogeneous observations. A monograph containing all classified lines of this spectrum is also needed.

The doublet and quartet terms are connected by intersystem combinations, but the sextet terms are not so connected with the rest. The relative uncertainty, x, may be a few hundred cm^{-1}.

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O II

Edlén	Config.	Desig.	J	Level	Interval
$2p\ ^4S_2$	$2s^2\,2p^3$	$2p^3\ ^4S^\circ$	1½	*0.0*	
$2p\ ^2D_3$	$2s^2\,2p^3$	$2p^3\ ^2D^\circ$	2½	*26808.4*	−21.0
$^2D_2$			1½	*26829.4*	
$2p\ ^2P_2$	$2s^2\,2p^3$	$2p^3\ ^2P^\circ$	1½	*40466.9*	−1.5
$^2P_1$			½	*40468.4*	
$2p'\ ^4P_3$	$2s\ 2p^4$	$2p^4\ ^4P$	2½	119837.7	−163.4
$^4P_2$			1½	120001.1	−82.4
$^4P_1$			½	120083.5	
$2p'\ ^2D_3$	$2s\ 2p^4$	$2p^4\ ^2D$	2½	165987.7	−8.3
$^2D_2$			1½	165996.0	
$3s\ ^4P_1$	$2s^2\,2p^2(^3P)3s$	$3s\ ^4P$	½	185235.36	105.32
$^4P_2$			1½	185340.68	158.52
$^4P_3$			2½	185499.20	
$3s\ ^2P_1$	$2s^2\,2p^2(^3P)3s$	$3s\ ^2P$	½	188888.38	179.99
$^2P_2$			1½	189068.37	
$2p'\ ^2S_1$	$2s\ 2p^4$	$2p^4\ ^2S$	½	195710.4	
$3p\ ^2S_1$	$2s^2\,2p^2(^3P)3p$	$3p\ ^2S^\circ$	½	*203942.21*	
$3p\ ^4D_1$	$2s^2\,2p^2(^3P)3p$	$3p\ ^4D^\circ$	½	*206730.80*	55.54
$^4D_2$			1½	*206786.34*	91.56
$^4D_3$			2½	*206877.90*	124.62
$^4D_4$			3½	*207002.52*	
$\overline{3s}\ ^2D_3$	$2s^2\,2p^2(^1D)3s$	$3s'\ ^2D$	2½	206971.3	−1.0
$^2D_2$			1½	206972.3	
$3p\ ^4P_1$	$2s^2\,2p^2(^3P)3p$	$3p\ ^4P^\circ$	½	*208346.17*	46.10
$^4P_2$			1½	*208392.27*	91.97
$^4P_3$			2½	*208484.24*	
$3p\ ^2D_2$	$2s^2\,2p^2(^3P)3p$	$3p\ ^2D^\circ$	1½	*211521.98*	190.68
$^2D_3$			2½	*211712.66*	
$3p\ ^4S_2$	$2s^2\,2p^2(^3P)3p$	$3p\ ^4S^\circ$	1½	*212161.94*	
$2p'\ ^2P_2$	$2s\ 2p^4$	$2p^4\ ^2P$	1½	212593.2	−169.2
$^2P_1$			½	212762.4	
$3p\ ^2P_1$	$2s^2\,2p^2(^3P)3p$	$3p\ ^2P^\circ$	½	*214169.74*	59.74
$^2P_2$			1½	*214229.48*	
	$2s^2\,2p^2(^1S)3s$	$3s''\ ^2S$	½	[226851]	
$\overline{3p}\ ^2F_3$	$2s^2\,2p^2(^1D)3p$	$3p'\ ^2F^\circ$	2½	*228723.3*	23.6
$^2F_4$			3½	*228746.9*	
$\overline{3p}\ ^2D_3$	$2s^2\,2p^2(^1D)3p$	$3p'\ ^2D^\circ$	2½	*229946.6*	−21.6
$^2D_2$			1½	*229968.2*	
$3d\ ^4F_2$	$2s^2\,2p^2(^3P)3d$	$3d\ ^4F$	1½	231296.05	54.03
$^4F_3$			2½	231350.08	77.91
$^4F_4$			3½	231427.99	102.27
$^4F_5$			4½	231530.26	
$3d\ ^4P_3$	$2s^2\,2p^2(^3P)3d$	$3d\ ^4P$	2½	232462.83	−73.23
$^4P_2$			1½	232536.06	−66.51
$^4P_1$			½	232602.57	
$\overline{3p}\ ^2P_1$	$2s^2\,2p^2(^1D)3p$	$3p'\ ^2P^\circ$	½	*232480.1*	46.6
$^2P_2$			1½	*232526.7*	
$3d\ ^4D_1$	$2s^2\,2p^2(^3P)3d$	$3d\ ^4D$	½	232711.70	34.28
$^4D_2$			1½	232745.98	1.53
$^4D_3$			2½	232747.51	6.35
$^4D_4$			3½	232753.86	
$3d\ ^2F_3$	$2s^2\,2p^2(^3P)3d$	$3d\ ^2F$	2½	232796.27	162.99
$^2F_4$			3½	232959.26	

O II

Edlén	Config.	Desig.	J	Level	Interval
$3d\ ^2P_2$	$2s^2\,2p^2(^3P)3d$	$3d\ ^2P$	1½	233430.10	−113.99
$^2P_1$			½	233544.09	
$3d\ ^2D_2$	$2s^2\,2p^2(^3P)3d$	$3d\ ^2D$	1½	234402.48	51.97
$^2D_3$			2½	234454.45	
$4s\ ^4P_1$	$2s^2\,2p^2(^3P)4s$	$4s\ ^4P$	½	238626.32	105.22
$^4P_2$			1½	238731.54	161.42
$^4P_3$			2½	238892.96	
$4s\ ^2P_1$	$2s^2\,2p^2(^3P)4s$	$4s\ ^2P$	½	240328.75	187.53
$^2P_2$			1½	240516.28	
$3s'\ ^6S_3$	$2s\ 2p^3(^5S^\circ)3s$	$3s'''\ ^6S^\circ$	2½	*245395.5* $+x$	
$4p\ ^4D_1$	$2s^2\,2p^2(^3P)4p$	$4p\ ^4D^\circ$	½	*245767.80*	48.49
$^4D_2$			1½	*245816.29*	86.56
$^4D_3$			2½	*245902.85*	126.10
$^4D_4$			3½	*246028.95*	
$4p\ ^2D_2$	$2s^2\,2p^2(^3P)4p$	$4p\ ^2D^\circ$	1½	*248009.1*	176.2
$^2D_3$			2½	*248185.3*	
$4p\ ^2P_1$	$2s^2\,2p^2(^3P)4p$	$4p\ ^2P^\circ$	½	*248425.35*	88.88
$^2P_2$			1½	*248514.23*	
	$2s^2\,2p^2(^1S)3p$	$3p''\ ^2P^\circ$	{ ½, 1½ }	[*250251*]	
$\overline{3d}\ ^2F_4$	$2s^2\,2p^2(^1D)3d$	$3d'\ ^2F$	3½	251220.9	−3.2
$^2F_3$			2½	251224.1	
$\overline{3d}\ ^2G_5$	$2s^2\,2p^2(^1D)3d$	$3d'\ ^2G$	4½	252607.7	−1.2
$^2G_4$			3½	252608.9	
$\overline{3d}\ ^2D_2$	$2s^2\,2p^2(^1D)3d$	$3d'\ ^2D$	1½	253046.23	2.12
$^2D_3$			2½	253048.35	
$\overline{3d}\ ^2P_1$	$2s^2\,2p^2(^1D)3d$	$3d'\ ^2P$	½	253789.51	2.36
$^2P_2$			1½	253791.87	
	$2s^2\,2p^2(^3P)4d$	$4d\ ^4F$	1½		
			2½		
$4d\ ^4F_4$			3½	254481.5	109.2
$^4F_5$			4½	254590.7	
	$2s^2\,2p^2(^3P)4d$	$4d\ ^4D$	½		
$4d\ ^4D_{2,3}$			{ 1½, 2½ }	254895.2	
			3½		
$3s'\ ^4S_2$	$2s\ 2p^3(^5S^\circ)3s$	$3s'''\ ^4S^\circ$	1½	*254982.2*	
$4d\ ^4P_3$	$2s^2\,2p^2(^3P)4d$	$4d\ ^4P$	2½	255104.6	−36.3
$^4P_2$			1½	255140.9	−21.7
$^4P_1$			½	255162.6	
$4d\ ^2P_2$	$2s^2\,2p^2(^3P)4d$	$4d\ ^2P$	1½	255172.5	−108.9
$^2P_1$			½	255281.4	
$4d\ ^2F_3$	$2s^2\,2p^2(^3P)4d$	$4d\ ^2F$	2½	255301.3	163.9
$^2F_4$			3½	255465.2	
$\overline{3d}\ ^2S_1$	$2s^2\,2p^2(^1D)3d$	$3d'\ ^2S$	½	255622.4	
$4f\ ^2D_3$	$2s^2\,2p^2(^3P)4f$	$4f\ ^2D^\circ$	2½	*255689.6*	−122.6
$^2D_2$			1½	*255812.2*	
$4f\ ^4D_4$	$2s^2\,2p^2(^3P)4f$	$4f\ ^4D^\circ$	3½	*255691.4*	−121.7
$^4D_3$			2½	*255813.1*	−100
$^4D_2$			1½	*255913* ±	1
$^4D_1$			½	*255912.0*	

O II—Continued

Eldén	Config.	Desig.	J	Level	Interval
$4f\ ^4G_3$	$2s^2\ 2p^2(^3P)4f$	$4f\ ^4G^{\circ}$	2½	*255755.8*	3.6
$^4G_4$			3½	*255759.4*	68.2
$^4G_5$			4½	*255827.6*	149.9
$^4G_6$			5½	*255977.5*	
$4f\ ^2G_4$	$2s^2\ 2p^2(^3P)4f$	$4f\ ^2G^{\circ}$	3½	*255829.4*	154.2
$^2G_5$			4½	*255983.6*	
$4d\ ^2D_2$	$2s^2\ 2p^2(^3P)4d$	$4d\ ^2D$	1½	255843.1	54.1
$^2D_3$			2½	255897.2	
$4f\ ^4F_2$	$2s^2\ 2p^2(^3P)4f$	$4f\ ^4F^{\circ}$	1½	*256083.5*	4.1
$^4F_3$			2½	*256087.6*	35.5
$^4F_4$			3½	*256123.1*	13.1
$^4F_5$			4½	*256136.2*	
$4f\ ^2F_3$	$2s^2\ 2p^2(^3P)4f$	$4f\ ^2F^{\circ}$	2½	*256125.8*	17.5
$^2F_4$			3½	*256143.3*	
$5s\ ^4P_1$	$2s^2\ 2p^2(^3P)5s$	$5s\ ^4P$	½	257693.7	104.2
$^4P_2$			1½	257797.9	165.9
$^4P_3$			2½	257963.8	
$5s\ ^2P_1$	$2s^2\ 2p^2(^3P)5s$	$5s\ ^2P$	½	258408.6	193.1
$^2P_2$			1½	258601.7	
$\overline{4s}\ ^2D_3$	$2s^2\ 2p^2(^1D)4s$	$4s'\ ^2D$	2½	259286.2	−0.8
$^2D_2$			1½	259287.0	
	$2s^2\ 2p^2(^3P)5p$	$5p\ ^4D^{\circ}$	½		
$5p\ ^4D_2$			1½	*260959*	83
$^4D_3$			2½	*261042*	138
$^4D_4$			3½	*261180*	
	$2s^2\ 2p^2(^3P)5p$	$5p\ ^4P^{\circ}$	½		
$5p\ ^4P_2$			1½	*261261.7*	92.6
$^4P_3$			2½	*261354.3*	
$5p\ ^2D_2$	$2s^2\ 2p^2(^3P)5p$	$5p\ ^2D^{\circ}$	1½	*261697.5*	171.9
$^2D_3$			2½	*261869.4*	
	$2s^2\ 2p^2(^3P)5d$	$5d\ ^4D$	½		
$5d\ ^4D_{2,3}$			{1½, 2½}	}265220.3	
			3½		
$5d\ ^4P_3$	$2s^2\ 2p^2(^3P)5d$	$5d\ ^4P$	2½	265431.5	−36.7
$^4P_{1,2}$			{1½, ½}	}265468.2	
	$2s^2\ 2p^2(^3P)5d$	$5d\ ^2F$	2½		
$5d\ ^2F_4$			3½	265578?	
$5f\ ^4D_4$	$2s^2\ 2p^2(^3P)5f$	$5f\ ^4D^{\circ}$	3½	*265639*	−66
$^4D_3$			2½	*265705?*	−57
$^4D_2$			1½	*265762?*	−97
$^4D_1$			½	*265859?*	
$5f\ ^4G_3$	$2s^2\ 2p^2(^3P)5f$	$5f\ ^4G^{\circ}$	2½	*265665?*	26
$^4G_4$			3½	*265691*	70
$^4G_5$			4½	*265761*	164
$^4G_6$			5½	*265925*	

O II—Continued

Eldén	Config.	Desig.	J	Level	Interval
$5f\ ^2G_4$	$2s^2\ 2p^2(^3P)5f$	$5f\ ^2G^{\circ}$	3½	*265763.0*	167.2
$^2G_5$			4½	*265930.2*	
	$2s^2\ 2p^2(^3P)5d$	$5d\ ^2D$	1½		
$5d\ ^2D_3$			2½	265856	
$5f\ ^4F_2$	$2s^2\ 2p^2(^3P)5f$	$5f\ ^4F^{\circ}$	1½	*265928?*	33
$^4F_3$			2½	*265961?*	24
$^4F_4$			3½	*265985*	14
$^4F_5$			4½	*265999*	
$5f\ ^2F_3$	$2s^2\ 2p^2(^3P)5f$	$5f\ ^2F^{\circ}$	2½	*265988?*	11
$^2F_4$			3½	*265999?*	
$3p'\ ^6P_2$	$2s\ 2p^3(^5S^{\circ})3p$	$3p'''\ ^6P$	1½	267763.39+x	7.46
$^6P_3$			2½	267770.85+x	12.55
$^6P_4$			3½	267783.40+x	
$\overline{4d}\ ^2F_3$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2F$	2½	274739.2	43.2
$^2F_4$			3½	274782.4	
$\overline{4d}\ ^2D_{2,3}$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2D$	{1½, 2½}	}274920	
$\overline{4d}\ ^2P_{1,2}$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2P$	{½, 1½}	}275611?	
$\overline{4f}\ ^2G$	$2s^2\ 2p^2(^1D)4f$	$4f'\ ^2G^{\circ}$	{3½, 4½}	}*275841.3*	
$\overline{4f}\ ^2F$	$2s^2\ 2p^2(^1D)4f$	$4f'\ ^2F^{\circ}$	{2½, 3½}	}*275879.6*	
	$2s^2\ 2p^2(^1S)3d$	$3d''\ ^2D$	{1½, 2½}	}[275951]	
$\overline{4d}\ ^2S_1$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2S$	½	275997?	
$\overline{4f}\ ^2D$	$2s^2\ 2p^2(^1D)4f$	$4f'\ ^2D^{\circ}$	{1½, 2½}	}*276066.3*	
$\overline{4f}\ ^2H$	$2s^2\ 2p^2(^1D)4f$	$4f'\ ^2H^{\circ}$	{4½, 5½}	}*276109.1*	
$\overline{4f}\ ^2P$	$2s^2\ 2p^2(^1D)4f$	$4f'\ ^2P^{\circ}$	{½, 1½}	}*276263.9?*	
$\overline{5s}\ ^2D_{2,3}$	$2s^2\ 2p^2(^1D)5s$	$5s'\ ^2D$	{1½, 2½}	}278140	
	O III ($^3P_0$)	*Limit*	------	***283550.9***	
$3d'\ ^6D_5$	$2s\ 2p^3(^5S^{\circ})3d$	$3d'''\ ^6D^{\circ}$	4½	*291895.90*+x	−0.88
$^6D_4$			3½	*291896.78*+x	−1.23
$^6D_3$			2½	*291898.01*+x	−1.10
$^6D_2$			1½	*291899.11*+x	−0.70
$^6D_1$			½	*291899.81*+x	
$4s'\ ^6S_3$	$2s\ 2p^3(^5S^{\circ})4s$	$4s'''\ ^6S^{\circ}$	2½	*298849.2* +x	

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O II OBSERVED TERMS*

Config. $1s^2+$	Observed Terms	
$2s^2\,2p^3$	$2p^3\ ^4S^{\circ}$; $2p^3\ ^2P^{\circ}$ $2p^3\ ^2D^{\circ}$	
$2s\,2p^4$	$2p^4\ ^4P$; $2p^4\ ^2S$ $2p^4\ ^2P$ $2p^4\ ^2D$	
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$
$2s^2\,2p^2(^3P)nx$	$3\text{–}5s\ ^4P$; $3\text{–}5s\ ^2P$	$3p\ ^4S^{\circ}$ $3, 5p\ ^4P^{\circ}$ $3\text{–}5p\ ^4D^{\circ}$; $3p\ ^2S^{\circ}$ $3, 4p\ ^2P^{\circ}$ $3\text{–}5p\ ^2D^{\circ}$
$2s^2\,2p^2(^1D)nx'$	$3\text{–}5s'\ ^2D$	$3p'\ ^2P^{\circ}$ $3p'\ ^2D^{\circ}$ $3p'\ ^2F^{\circ}$
$2s\,2p^3(^5S^{\circ})nx'''$	$3, 4s'''\ ^6S^{\circ}$; $3s'''\ ^4S^{\circ}$	$3p'''\ ^6P$
	$nd\ (n\geq 3)$	$nf\ (n\geq 4)$
$2s^2\,2p^2(^3P)nx$	$3\text{–}5d\ ^4P$ $3\text{–}5d\ ^4D$ $3, 4d\ ^4F$; $3, 4d\ ^2P$ $3\text{–}5d\ ^2D$ $3\text{–}5d\ ^2F$	$4, 5f\ ^4D^{\circ}$ $4, 5f\ ^4F^{\circ}$ $4, 5f\ ^4G^{\circ}$; $4f\ ^2D^{\circ}$ $4, 5f\ ^2F^{\circ}$ $4, 5f\ ^2G^{\circ}$
$2s^2\,2p^2(^1D)nx'$	$3, 4d'\ ^2S$ $3, 4d'\ ^2P$ $3, 4d'\ ^2D$ $3, 4d'\ ^2F$ $3d'\ ^2G$	$4f'\ ^2P^{\circ}$ $4f'\ ^2D^{\circ}$ $4f'\ ^2F^{\circ}$ $4f'\ ^2G^{\circ}$ $4f'\ ^2H^{\circ}$
$2s\,2p^3(^5S^{\circ})nx'''$	$3d'''\ ^6D^{\circ}$	

*For predicted terms in the spectra of the N I isoelectronic sequence, see Introduction.

O III

(C I sequence; 6 electrons) $Z=8$

Ground state $1s^2\,2s^2\,2p^2\ ^3P_0$

$2p^2\ ^3P_0$ **443193.5** cm^{-1} I. P. 54.934 volts

The terms are from the papers by Edlén. The singlet, triplet and quintet terms are connected by intersystem combinations. Edlén has kindly furnished some unpublished results for inclusion here, namely, that intersystem combinations with quintet terms indicate that his published absolute values of these terms should be decreased by 418 cm^{-1}. This correction has been incorporated into the tabular values of the quintet terms.

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O III

Edlén	Config.	Desig.	J	Level	Interval
$2p\ ^3P_0$	$2s^2\ 2p^2$	$2p^2\ ^3P$	0	0.0	
$^3P_1$			1	113.4	113.4
$^3P_2$			2	306.8	193.4
$2p\ ^1D_2$	$2s^2\ 2p^2$	$2p^2\ ^1D$	2	20271.0	
$2p\ ^1S_0$	$2s^2\ 2p^2$	$2p^2\ ^1S$	0	43183.5	
$2p'\ ^5S_2$	$2s\ 2p^3$	$2p^3\ ^5S^{\circ}$	2	*60312.1*	
$2p'\ ^3D_3$	$2s\ 2p^3$	$2p^3\ ^3D^{\circ}$	3	*120025.4*	
$^3D_2$			2	*120052.6*	−27.2
$^3D_1$			1	*120058.5*	−5.9
$2p'\ ^3P_2$	$2s\ 2p^3$	$2p^3\ ^3P^{\circ}$	2	*142381.7*	
$^3P_1$			1	*142382.8*	−1.1
$^3P_0$			0	*142396.9*	−14.1
$2p'\ ^1D_2$	$2s\ 2p^3$	$2p^3\ ^1D^{\circ}$	2	*187049.4*	
$2p'\ ^3S_1$	$2s\ 2p^3$	$2p^3\ ^3S^{\circ}$	1	*197086.7*	
$2p'\ ^1P_1$	$2s\ 2p^3$	$2p^3\ ^1P^{\circ}$	1	*210458.5*	
$3s\ ^3P_0$	$2s^2\ 2p(^2P^{\circ})3s$	$3s\ ^3P^{\circ}$	0	*267257.29*	
$^3P_1$			1	*267375.65*	118.36
$^3P_2$			2	*267632.59*	256.94
$3s\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})3s$	$3s\ ^1P^{\circ}$	1	*273080.07*	
$2p''\ ^3P_2$	$2p^4$	$2p^4\ ^3P$	2	283758.9	
$^3P_1$			1	283976.6	−217.7
$^3P_0$			0	284073.3	−96.7
$3p\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})3p$	$3p\ ^1P$	1	290956.62	
$3p\ ^3D_1$	$2s^2\ 2p(^2P^{\circ})3p$	$3p\ ^3D$	1	293865.26	
$^3D_2$			2	294001.60	136.34
$^3D_3$			3	294221.65	220.05
$3p\ ^3S_1$	$2s^2\ 2p(^2P^{\circ})3p$	$3p\ ^3S$	1	297557.50	
$2p''\ ^1D_2$	$2p^4$	$2p^4\ ^1D$	2	298289.4	
$3p\ ^3P_0$	$2s^2\ 2p(^2P^{\circ})3p$	$3p\ ^3P$	0	300228.21	
$^3P_1$			1	300310.31	82.10
$^3P_2$			2	300440.85	130.54
$3p\ ^1D_2$	$2s^2\ 2p(^2P^{\circ})3p$	$3p\ ^1D$	2	306584.8	
$3p\ ^1S_0$	$2s^2\ 2p(^2P^{\circ})3p$	$3p\ ^1S$	0	313801.07	
$3d\ ^3F_2$	$2s^2\ 2p(^2P^{\circ})3d$	$3d\ ^3F^{\circ}$	2	*324462.43*	
$^3F_3$			3	*324658.25*	195.79
$^3F_4$			4	*324836.41*	178.16
$3d\ ^1D_2$	$2s^2\ 2p(^2P^{\circ})3d$	$3d\ ^1D^{\circ}$	2	*324734.22*	
$3d\ ^3D_1$	$2s^2\ 2p(^2P^{\circ})3d$	$3d\ ^3D^{\circ}$	1	*327227.94*	
$^3D_2$			2	*327277.18*	49.24
$^3D_3$			3	*327350.90*	73.72
$3d\ ^3P_2$	$2s^2\ 2p(^2P^{\circ})3d$	$3d\ ^3P^{\circ}$	2	*329467.98*	
$^3P_1$			1	*329581.98*	−114.00
$^3P_0$			0	*329643.43*	−61.45
$3d\ ^1F_3$	$2s^2\ 2p(^2P^{\circ})3d$	$3d\ ^1F^{\circ}$	3	*331820.2*	
$3d\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})3d$	$3d\ ^1P^{\circ}$	1	*332777.1*	
$3s'\ ^5P_1$	$2s\ 2p^2(^4P)3s$	$3s\ ^5P$	1	338565.87	
$^5P_2$			2	338690.34	124.47
$^5P_3$			3	338851.50	161.16
$2p''\ ^1S_0$	$2p^4$	$2p^4\ ^1S$	0	343302.6?	

O III

Edlén	Config.	Desig.	J	Level	Interval
$3s'\ ^3P_0$	$2s\ 2p^2(^4P)3s$	$3s\ ^3P$	0	350026.1	
$^3P_1$			1	350122.9	96.8
$^3P_2$			2	350302.3	179.4
$4s\ ^3P_0$	$2s^2\ 2p(^2P^{\circ})4s$	$4s\ ^3P^{\circ}$	0	*356732*	
$^3P_1$			1	*356838*	106
$^3P_2$			2	*357111*	273
$4s\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})4s$	$4s\ ^1P^{\circ}$	1	*358667.4*	
$3p'\ ^3S_1$	$2s\ 2p^2(^4P)3p$	$3p\ ^3S^{\circ}$	1	*363266.8*	
$3p'\ ^5D_0$	$2s\ 2p^2(^4P)3p$	$3p\ ^5D^{\circ}$	0	*365515.76*	
$^5D_1$			1	*365550.60*	34.84
$^5D_2$			2	*365619.12*	68.52
$^5D_3$			3	*365719.16*	100.04
$^5D_4$			4	*365846.46*	127.30
$4p\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})4p$	$4p\ ^1P$	1	365723.9	
$4p\ ^3D_1$	$2s^2\ 2p(^2P^{\circ})4p$	$4p\ ^3D$	1	366486.91	
$^3D_2$			2	366594.01	107.10
$^3D_3$			3	366801.04	207.03
$4p\ ^3S_1$	$2s^2\ 2p(^2P^{\circ})4p$	$4p\ ^3S$	1	367952.20	
$3p'\ ^5P_1$	$2s\ 2p^2(^4P)3p$	$3p\ ^5P^{\circ}$	1	*368526.37*	
$^5P_2$			2	*368583.63*	57.26
$^5P_3$			3	*368684.75*	101.12
$4p\ ^3P_0$	$2s^2\ 2p(^2P^{\circ})4p$	$4p\ ^3P$	0	370326.7	
$^3P_1$			1	370415.7	89.0
$^3P_2$			2	370524.2	108.5
$4p\ ^1D_2$	$2s^2\ 2p(^2P^{\circ})4p$	$4p\ ^1D$	2	370900.6	
$4p\ ^1S_0$	$2s^2\ 2p(^2P^{\circ})4p$	$4p\ ^1S$	0	373046.2	
$3p'\ ^3D_1$	$2s\ 2p^2(^4P)3p$	$3p\ ^3D^{\circ}$	1	*374575*	
$^3D_2$			2	*374662.5*	88
$^3D_3$			3	*374798.6*	136.1
$3p'\ ^5S_2$	$2s\ 2p^2(^4P)3p$	$3p\ ^5S^{\circ}$	2	*376067.66*	
$4d\ ^3F_2$	$2s^2\ 2p(^2P^{\circ})4d$	$4d\ ^3F^{\circ}$	2	*377375*	
			3		
			4		
$4d\ ^1D_2$	$2s^2\ 2p(^2P^{\circ})4d$	$4d\ ^1D^{\circ}$	2	*377687*	
$3p'\ ^3P_2$	$2s\ 2p^2(^4P)3p$	$3p\ ^3P^{\circ}$	2	*378408.5*	
$^3P_1$			1	*378420.9*	−12.4
$^3P_0$			0	*378438.1*	−17.2
$4d\ ^3D_1$	$2s^2\ 2p(^2P^{\circ})4d$	$4d\ ^3D^{\circ}$	1	*379232*	
$^3D_2$			2	*379293*	61
$^3D_3$			3	*379356*	63
$4d\ ^3P_2$	$2s^2\ 2p(^2P^{\circ})4d$	$4d\ ^3P^{\circ}$	2	*380706*	
			1		
			0		
$4d\ ^1F_3$	$2s^2\ 2p(^2P^{\circ})4d$	$4d\ ^1F^{\circ}$	3	*380782*	
$4d\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})4d$	$4d\ ^1P^{\circ}$	1	*381086*	
	$2s^2\ 2p(^2P^{\circ})5s$	$5s\ ^3P^{\circ}$	0		
			1		
$5s\ ^3P_2$			2	*392221*	
$5s\ ^1P_1$	$2s^2\ 2p(^2P^{\circ})5s$	$5s\ ^1P^{\circ}$	1	*392778*	
$\overline{3s'}\ ^3D_1$	$2s\ 2p^2(^2D)3s$	$3s'\ ^3D$	1	394090	
$^3D_2$			2	394126	36
$^3D_3$			3	394195	69

O III—Continued

Edlén	Config.	Desig.	J	Level	Interval
3d′ $^5F_1$	2s 2p²(⁴P)3d	3d ^5F	1	394516.45	
$^5F_2$			2	394555.15	38.70
$^5F_3$			3	394612.70	57.55
$^5F_4$			4	394688.44	75.74
$^5F_5$			5	394780.47	92.03
3d′ $^5D_0$	$2s\,2p^2(^4P)3d$	3d ^5D	0	398135.0	
$^5D_1$			1	398131.4	−3.6
$^5D_2$			2	398127.3	−4.1
$^5D_3$			3	398137.4	10.1
D_4			4	398218.8	81.4
3d′ $^5P_3$	$2s\,2p^2(^4P)3d$	3d ^5P	3	398474.3	
$^5P_2$			2	398544.3	−70.0
$^5P_1$			1	398582.8	−38.5
3d′ $^3P_2$	$2s\,2p^2(^4P)3d$	3d ^3P	2	400354.8	
$^3P_1$			1	400464.7	−109.9
$^3P_0$			0	400518.4	−53.7
3d′ $^3F_2$	$2s\,2p^2(^4P)3d$	3d ^3F	2	401379	
$^3F_3$			3	401475.4	96
$^3F_4$			4	401609.1	133.7
5d $^3F_2$	$2s^2\,2p(^2P^\circ)5d$	5d $^3F^\circ$	2	*401530*	
			3		
			4		
5d $^1D_2$	$2s^2\,2p(^2P^\circ)5d$	5d $^1D^\circ$	2	*401787*	
	$2s^2\,2p(^2P^\circ)5d$	5d $^3D^\circ$	1		
			2		
5d $^3D_3$			3	*402530*	
5d $^1F_3$	$2s^2\,2p(^2P^\circ)5d$	5d $^1F^\circ$	3	*403374*	
5d $^1P_1$	$2s^2\,2p(^2P^\circ)5d$	5d $^1P^\circ$	1	*403526*	
3d′ $^3D_1$	$2s\,2p^2(^4P)3d$	3d ^3D	1	405805.1	
$^3D_2$			2	405834.1	29.0
$^3D_3$			3	405883.0	48.9
6d $^1D_2$	$2s^2\,2p(\ P^\circ)6d$	6d $^1D^\circ$	2	*414675*	
	$2s^2\,2p(^2P^\circ)6d$	6d $^3D^\circ$	1		
			2		
6d $^3D_3$			3	*415181*	

O III—Continued

Edlén	Config.	Desig.	J	Level	Interval
7d $^1F_3$	$2s^2\,2p(^2P^\circ)7d$	7d $^1F^\circ$	3	*422977*	
$\overline{3p}'$ $^1F_3$	$2s\,2p^2(^2D)3p$	3p′ $^1F^\circ$	3	*424998*	
$\overline{3p}'$ $^1D_2$	$2s\,2p^2(^2D)3p$	3p′ $^1D^\circ$	2	*426338*	
4s′ $^5P_1$	$2s\,2p^2(^4P)4s$	4s ^5P	1	428487	
$^5P_2$			2	428606	119
$^5P_3$			3	428769	163
$\overline{3p}'$ $^1P_1$	$2s\,2p^2(^2D)3p$	3p′ $^1P^\circ$	1	*430025*	
4p′ $^3S_1$	$2s\,2p^2(^4P)4p$	4p $^3S^\circ$	1	*437015.0*	
4p′ $^5D_0$	$2s\,2p^2(^4P)4p$	4p $^5D^\circ$	0		
$^5D_1$			1	*438241.0*	
$^5D_2$			2	*438303.2*	62.2
$^5D_3$			3	*438395.2*	92.0
$^5D_4$			4	*438517.5*	122.3
4p′ $^5P_1$	$2s\,2p^2(^4P)4p$	4p $^5P^\circ$	1	*439278.1*	
$^5P_2$			2	*439329.5*	51.4
$^5P_3$			3	*439427.6*	98.1
	$2s\,2p^2(^4P)4p$	4p $^3D^\circ$	1		
			2		
4p′ $^3D_3$			3	*442710*	
	O IV ($^2P_{½}$)	*Limit*	------	443193.5	
4d′ $^5P_3$	$2s\,2p^2(^4P)4d$	4d ^5P	3	450167	
$^5P_2$			2	450237	−70
$^5P_1$			1	450291	−54
$\overline{3d}'$ ^3F	$2s\,2p^2(^2D)3d$	3d′ ^3F	2, 3, 4	452855	
$\overline{3d}'$ ^3D	$2s\,2p^2(^2D)3d$	3d′ ^3D	1, 2, 3	454174	
$\overline{3d}'$ ^3P	$2s\,2p^2(^2D)3d$	3d′ ^3P	0, 1, 2	457634	
5d′ $^5P_3$	$2s\,2p^2(^4P)5d$	5d ^5P		473750	
			1		

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O III Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2\,2p^2$	$2p^2\ ^3P$ $2p^2\ ^1S$ $\quad$ $2p^2\ ^1D$		
$2s\,2p^3$	$2p^3\ ^5S^\circ$ $2p^3\ ^3S^\circ$ $\quad$ $2p^3\ ^3P^\circ$ $\quad$ $2p^3\ ^3D^\circ$ $2p^3\ ^1P^\circ$ $\quad$ $2p^3\ ^1D^\circ$		
$2p^4$	$2p^4\ ^3P$ $2p^4\ ^1S$ $\quad$ $2p^4\ ^1D$		
	ns ($n\geq3$)	np ($n\geq3$)	nd ($n\geq3$)
$2s^2\,2p(^2P^\circ)nx$	3–5s $^3P^\circ$ 3–5s $^1P^\circ$	3, 4p ^3S $\quad$ 3, 4p ^3P $\quad$ 3, 4p ^3D 3, 4p ^1S $\quad$ 3, 4p ^1P $\quad$ 3, 4p ^1D	3, 4d $^3P^\circ$ $\quad$ 3–6d $^3D^\circ$ $\quad$ 3–5d $^3F^\circ$ 3–5d $^1P^\circ$ $\quad$ 3–6d $^1D^\circ$ $\quad$ 3–5, 7d $^1F^\circ$
$2s\,2p^2(^4P)nx$	3, 4s ^5P 3s ^3P	3p $^5S^\circ$ $\quad$ 3, 4p $^5P^\circ$ $\quad$ 3, 4p $^5D^\circ$ 3, 4p $^3S^\circ$ $\quad$ 3p $^3P^\circ$ $\quad$ 3, 4p $^3D^\circ$	3–5d ^5P $\quad$ 3d ^5D $\quad$ 3d ^5F 3d ^3P $\quad$ 3d ^3D $\quad$ 3d ^3F
$2s\,2p^2(^2D)nx'$	3s′ ^3D	3p′ $^1P^\circ$ $\quad$ 3p′ $^1D^\circ$ $\quad$ 3p′ $^1F^\circ$	3d′ ^3P $\quad$ 3d′ ^3D $\quad$ 3d′ ^3F

* For predicted terms in the spectra of the C I isoelectronic sequence, see Introduction.

O IV

(B I sequence; 5 electrons) $Z=8$

Ground state $1s^2\,2s^2\,2p\ {}^2P^\circ_{\frac{1}{2}}$

$2p\ {}^2P^\circ_{\frac{1}{2}}$ ***624396.5*** cm^{-1} I. P. 77.394 volts

Most of the terms are from Edlén's Monograph, corrected to agree with his 1935 paper, in which he adds several terms from $2p^2({}^1D)$ and relabels his $2p^2({}^3P)3s\ {}^2P$ term as $2p^2({}^1D)3s\ {}^2D$. He also lists a combination in the visible, $3s'\ {}^2P^\circ - 3p'\ {}^2D$, from which a revised value of $3s'\ {}^2P^\circ$ has been calculated. A few other additions and corrections kindly communicated by Edlén have been incorporated into the table.

The term $6f\ {}^2F^\circ$ is from the paper by Whitelaw and Mack.

No intercombinations between the doublet and quartet terms have been observed, but the limits adopted by Edlén are based on well-established series, and the relative positions of the two groups of terms differ by probably only a small constant x.

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O IV

Edlén	Config.	Desig.	J	Level	Interval
$2p\ {}^2P_1$	$2s^2({}^1S)2p$	$2p\ {}^2P^\circ$	½	*0.0*	386.5
${}^2P_2$			1½	*386.5*	
$2p'\ {}^4P_1$	$2s\,2p^2$	$2p^2\ {}^4P$	½	71177.0+x	131.4
${}^4P_2$			1½	71308.4+x	184.5
${}^4P_3$			2½	71492.9+x	
$2p'\ {}^2D_3$	$2s\,2p^2$	$2p^2\ {}^2D$	2½	126936.3	−14.0
${}^2D_2$			1½	126950.3	
$2p'\ {}^2S_1$	$2s\,2p^2$	$2p^2\ {}^2S$	½	164366.9	
$2p'\ {}^2P_1$	$2s\,2p^2$	$2p^2\ {}^2P$	½	180481.3	243.3
${}^2P_2$			1½	180724.6	
$2p''\ {}^4S_2$	$2p^3$	$2p^3\ {}^4S^\circ$	1½	*231275.1*+x	
$2p''\ {}^2D_3$	$2p^3$	$2p^3\ {}^2D^\circ$	2½	*255156.7*	−29.3
${}^2D_2$			1½	*255186.0*	
$2p''\ {}^2P_1$	$2p^3$	$2p^3\ {}^2P^\circ$	½	*289016.1*	7.9
${}^2P_2$			1½	*289024.0*	
$3s\ {}^2S_1$	$2s^2({}^1S)3s$	$3s\ {}^2S$	½	357614.8	
$3p\ {}^2P_1$	$2s^2({}^1S)3p$	$3p\ {}^2P^\circ$	½	*390161.1*	87.1
${}^2P_2$			1½	*390248.2*	
$3d\ {}^2D_2$	$2s^2({}^1S)3d$	$3d\ {}^2D$	1½	419533.5	16.7
${}^2D_3$			2½	419550.2	
$3s'\ {}^4P_1$	$2s\,2p({}^3P^\circ)3s$	$3s\ {}^4P^\circ$	½	*438588.5*+x	135.1
${}^4P_2$			1½	*438723.6*+x	246.9
${}^4P_3$			2½	*438970.5*+x	
$3s'\ {}^2P_1$	$2s\,2p({}^3P^\circ)3s$	$3s\ {}^2P^\circ$	½	*452808.0*	265.0
${}^2P_2$			1½	*453073.0*	
$3p'\ {}^2P_1$	$2s\,2p({}^3P^\circ)3p$	$3p\ {}^2P$	½	467231.1	115.4
${}^2P_2$			1½	467346.5	
$3p'\ {}^4D_1$	$2s\,2p({}^3P^\circ)3p$	$3p\ {}^4D$	½	468075.4+x	78.8
${}^4D_2$			1½	468154.2+x	135.5
${}^4D_3$			2½	468289.7+x	209.7
${}^4D_4$			3½	468499.4+x	
$3p'\ {}^4S_2$	$2s\,2p({}^3P^\circ)3p$	$3p\ {}^4S$	1½	474217.8+x	
$3p'\ {}^4P_1$	$2s\,2p({}^3P^\circ)3p$	$3p\ {}^4P$	½	478587.7+x	94.5
${}^4P_2$			1½	478682.2+x	129.1
${}^4P_3$			2½	478811.3+x	
$3p'\ {}^2D_2$	$2s\,2p({}^3P^\circ)3p$	$3p\ {}^2D$	1½	482667.5	255.6
${}^2D_3$			2½	482923.1	
$4s\ {}^2S_1$	$2s^2({}^1S)4s$	$4s\ {}^2S$	½	485823.1	
$3p'\ {}^2S_1$	$2s\,2p({}^3P^\circ)3p$	$3p\ {}^2S$	½	492880	
$3d'\ {}^4F_2$	$2s\,2p({}^3P^\circ)3d$	$3d\ {}^4F^\circ$	1½	*494907.5*+x	78.8
${}^4F_3$			2½	*494986.3*+x	112.4
${}^4F_4$			3½	*495098.7*+x	154.1
${}^4F_5$			4½	*495252.8*+x	
$3d'\ {}^4D_1$	$2s\,2p({}^3P^\circ)3d$	$3d\ {}^4D^\circ$	½	*499506.4*+x	28.9
${}^4D_2$			1½	*499535.3*+x	46.7
${}^4D_3$			2½	*499582.0*+x	64.6
${}^4D_4$			3½	*499646.6*+x	

O IV—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3d'\ ^2D_2$	$2s\ 2p(^3P^\circ)3d$	$3d\ ^2D^\circ$	$1\frac{1}{2}$	*501511.3*	55.1
$^2D_3$			$2\frac{1}{2}$	*501566.4*	
$3d'\ ^4P_3$	$2s\ 2p(^3P^\circ)3d$	$3d\ ^4P^\circ$	$2\frac{1}{2}$	*503834.5+x*	−113.4
$^4P_2$			$1\frac{1}{2}$	*503947.9+x*	−73.8
$^4P_1$			$\frac{1}{2}$	*504021.7+x*	
$4d\ ^2D_2$	$2s^2(^1S)4d$	$4d\ ^2D$	$1\frac{1}{2}$	510560	7
$^2D_3$			$2\frac{1}{2}$	510567	
$3d'\ ^2F_3$	$2s\ 2p(^3P^\circ)3d$	$3d\ ^2F^\circ$	$2\frac{1}{2}$	*510746.1*	232.4
$^2F_4$			$3\frac{1}{2}$	*510978.5*	
$3d'\ ^2P_2$	$2s\ 2p(^3P^\circ)3d$	$3d\ ^2P^\circ$	$1\frac{1}{2}$	*514217*	−151
$^2P_1$			$\frac{1}{2}$	*514368*	
$\overline{3s'}\ ^2P_1$	$2s\ 2p(^1P^\circ)3s$	$3s'\ ^2P^\circ$	$\frac{1}{2}$	*518684*	6
$^2P_2$			$1\frac{1}{2}$	*518690*	
$5s\ ^2S_1$	$2s^2(^1S)5s$	$5s\ ^2S$	$\frac{1}{2}$	539368	
$\overline{3p'}\ ^2D_2$	$2s\ 2p(^1P^\circ)3p$	$3p'\ ^2D$	$1\frac{1}{2}$	547311	25
$^2D_3$			$2\frac{1}{2}$	547336	
$\overline{3p'}\ ^2P_1$	$2s\ 2p(^1P^\circ)3p$	$3p'\ ^2P$	$\frac{1}{2}$	549792	63
$^2P_2$			$1\frac{1}{2}$	549855	
	$2s^2(^1S)5d$	$5d\ ^2D$	$1\frac{1}{2}$		
$5d\ ^2D_3$			$2\frac{1}{2}$	552034	
$5f\ ^2F$	$2s^2(^1S)5f$	$5f\ ^2F^\circ$	$\{2\frac{1}{2}, 3\frac{1}{2}\}$	*552490*	
$\overline{3p'}\ ^2S_1$	$2s\ 2p(^1P^\circ)3p$	$3p'\ ^2S$	$\frac{1}{2}$	554461	
$4s'\ ^4P_1$	$2s\ 2p(^3P^\circ)4s$	$4s\ ^4P^\circ$	$\frac{1}{2}$	*568638* +x	135
$^4P_2$			$1\frac{1}{2}$	*568773* +x	247
$^4P_3$			$2\frac{1}{2}$	*569020* +x	
	$2s\ 2p(^1P^\circ)3d$	$3d'\ ^2F^\circ$	$2\frac{1}{2}$		
$\overline{3d'}\ ^2F_4$			$3\frac{1}{2}$	*570791*	
$4s'\ ^2P_1$	$2s\ 2p(^3P^\circ)4s$	$4s\ ^2P^\circ$	$\frac{1}{2}$	*573696*	211
$^2P_2$			$1\frac{1}{2}$	*573907*	
	$2s^2(^1S)6d$	$6d\ ^2D$	$1\frac{1}{2}$		
$6d\ ^2D_3$			$2\frac{1}{2}$	574373	
$4p'\ ^2P_1$	$2s^2\ 2p(^3P^\circ)4p$	$4p\ ^2P$	$\frac{1}{2}$	575204	169
$^2P_2$			$1\frac{1}{2}$	575373	
$\overline{3d'}\ ^2D_2$	$2s\ 2p(^1P^\circ)3d$	$3d'\ ^2D^\circ$	$1\frac{1}{2}$	*575819*	34
$^2D_3$			$2\frac{1}{2}$	*575853*	
$3s''\ ^4P_1$	$2p^2(^3P)3s$	$3s''\ ^4P$	$\frac{1}{2}$	576591 +x	144
$^4P_2$			$1\frac{1}{2}$	576735 +x	212
$^4P_3$			$2\frac{1}{2}$	576947 +x	
$\overline{3d'}\ ^2P_1$	$2s\ 2p(^1P^\circ)3d$	$3d'\ ^2P^\circ$	$\frac{1}{2}$	*581721*	22
$^2P_2$			$1\frac{1}{2}$	*581743*	
$4p'\ ^2D_2$	$2s\ 2p(^3P^\circ)4p$	$4p\ ^2D$	$1\frac{1}{2}$	584552	216
$^2D_3$			$2\frac{1}{2}$	584768	
$7f\ ^2F$	$2s^2(^1S)7f$	$7f\ ^2F^\circ$	$\{2\frac{1}{2}, 3\frac{1}{2}\}$	*587850*	
$4p'\ ^2S$	$2s\ 2p(^3P^\circ)4p$	$4p\ ^2S$	$\frac{1}{2}$	590071	
	$2s\ 2p(^3P^\circ)4d$	$4d\ ^4D^\circ$	$\frac{1}{2}$		
			$1\frac{1}{2}$		
			$2\frac{1}{2}$		
$4d'\ ^4D_4$			$3\frac{1}{2}$	*591767* +x	
$4d'\ ^4P_3$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^4P^\circ$	$2\frac{1}{2}$	*592999* +x	
			$1\frac{1}{2}$		
			$\frac{1}{2}$		

O IV—Continued

Edlén	Config.	Desig.	J	Level	Interval
$4d'\ ^2D_2$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^2D^\circ$	$1\frac{1}{2}$	*593627*	81
$^2D_3$			$2\frac{1}{2}$	*593708*	
$4f'\ ^2F_3$	$2s\ 2p(^3P^\circ)4f$	$4f\ ^2F$	$2\frac{1}{2}$	594007	73
$^2F_4$			$3\frac{1}{2}$	594080	
$4f'\ ^2D_2$	$2s\ 2p(^3P^\circ)4f$	$4f\ ^2D$	$1\frac{1}{2}$	594337	205
$^2D_3$			$2\frac{1}{2}$	594542	
$4d'\ ^2F_3$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^2F^\circ$	$2\frac{1}{2}$	*596299*	178
$^2F_4$			$3\frac{1}{2}$	*596477*	
$3p''\ ^2S_1$	$2p^2(^3P)3p$	$3p''\ ^2S^\circ$	$\frac{1}{2}$	*597254*	
$8f\ ^2F$	$2s^2(^1S)8f$	$8f\ ^2F^\circ$	$\{2\frac{1}{2}, 3\frac{1}{2}\}$	*597352*	
$4d'\ ^2P_2$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^2P^\circ$	$1\frac{1}{2}$	*597726*	−137
$^2P_1$			$\frac{1}{2}$	*597863*	
$\overline{3s''}\ ^2D_2$	$2p^2(^1D)3s$	$3s'''\ ^2D$	$1\frac{1}{2}$	600092	14
$^2D_3$			$2\frac{1}{2}$	600106	
	$2p^2(^3P)3p$	$3p''\ ^4D^\circ$	$\frac{1}{2}$		
			$1\frac{1}{2}$		
			$2\frac{1}{2}$		
$3p''\ ^4D_4$			$3\frac{1}{2}$	*602977* +x	
	$2p^2(^3P)3p$	$3p''\ ^4P^\circ$	$\frac{1}{2}$		
			$1\frac{1}{2}$		
$3p''\ ^4P_3$			$2\frac{1}{2}$	*606434* +x	
$3p''\ ^2D_3$	$2p^2(^3P)3p$	$3p''\ ^2D^\circ$	$2\frac{1}{2}$	*615431*	−29
$^2D_2$			$1\frac{1}{2}$	*615460*	
$3p''\ ^4S_2$	$2p^2(^3P)3p$	$3p''\ ^4S^\circ$	$1\frac{1}{2}$	*616588* +x	
	O V ($^1S_0$)	*Limit*	------	***624396.5***	
$\overline{3p''}\ ^2F$	$2p^2(^1D)3p$	$3p'''\ ^2F^\circ$	$\{2\frac{1}{2}, 3\frac{1}{2}\}$	*624882*	
	$2s\ 2p(^3P^\circ)5p$	$5p\ ^2P$	$\frac{1}{2}$		
$5p'\ ^2P_2$			$1\frac{1}{2}$	628496	
	$2p^2(^3P)3d$	$3d''\ ^2F$	$2\frac{1}{2}$		
$3d''\ ^2F_4$			$3\frac{1}{2}$	630095	
$5p'\ ^2D_2$	$2s\ 2p(^3P^\circ)5p$	$5p\ ^2D$	$1\frac{1}{2}$	630703	176
$^2D_3$			$2\frac{1}{2}$	630879	
$3d''\ ^2D_3$	$2p^2(^3P)3d$	$3d''\ ^2D$	$2\frac{1}{2}$	632426	−168
$^2D_2$			$1\frac{1}{2}$	632594	
	$2s\ 2p(^3P^\circ)5d$	$5d\ ^4D^\circ$	$\frac{1}{2}$		
			$1\frac{1}{2}$		
			$2\frac{1}{2}$		
$5d'\ ^4D_4$			$3\frac{1}{2}$	*633896* +x	
$5d'\ ^4P_3$	$2s\ 2p(^3P^\circ)5d$	$5d\ ^4P^\circ$	$2\frac{1}{2}$	*634245.5+x*	
			$1\frac{1}{2}$		
			$\frac{1}{2}$		
$5d'\ ^2F_3$	$2s\ 2p(^3P^\circ)5d$	$5d\ ^2F^\circ$	$2\frac{1}{2}$	*636024*	212
$^2F_4$			$3\frac{1}{2}$	*636236*	
$5d'\ ^2P_2$	$2s\ 2p(^3P^\circ)5d$	$5d\ ^2P^\circ$	$1\frac{1}{2}$	*636492?*	
			$\frac{1}{2}$		
$3d''\ ^4P_3$	$2p^2(^3P)3d$	$3d''\ ^4P$	$2\frac{1}{2}$	636851 +x	−99
$^4P_2$			$1\frac{1}{2}$	636950 +x	−62
$^4P_1$			$\frac{1}{2}$	637012 +x	
$\overline{3d''}\ ^2D$	$2p^2(^1D)3d$	$3d'''\ ^2D$	$\{1\frac{1}{2}, 2\frac{1}{2}\}$	646859	

O IV—Continued

Edlén	Config.	Desig.	J	Level	Interval
$\overline{3d}''\ ^2F_3$ $^2F_4$	$2p^2(^1D)3d$	$3d'''\ ^2F$	$2\frac{1}{2}$ $3\frac{1}{2}$	651098 651117	19
$\overline{3d}''\ ^2P_2$ $^2P_1$	$2p^2(^1D)3d$	$3d'''\ ^2P$	$1\frac{1}{2}$ $\frac{1}{2}$	653328 653411	−83
   $6d'\ ^4D_4$	$2s\ 2p(^3P^\circ)6d$	$6d\ ^4D^\circ$	$\frac{1}{2}$ $1\frac{1}{2}$ $2\frac{1}{2}$ $3\frac{1}{2}$	 *656328* +x	
$\overline{4p}'\ ^2D_3$	$2s\ 2p(^1P^\circ)4p$	$4p'\ ^2D$	$1\frac{1}{2}$ $2\frac{1}{2}$	 656748	
$\overline{3d}''\ ^2S_1$	$2p^2(^1D)3d$	$3d'''\ ^2S$	$\frac{1}{2}$	659998	
$\overline{4d}'\ ^2D_3$	$2s\ 2p(^1P^\circ)4d$	$4d'\ ^2D^\circ$	$1\frac{1}{2}$ $2\frac{1}{2}$	 *668538*	
   $7d'\ ^4D_4$	$2s\ 2p(^3P^\circ)7d$	$7d\ ^4D^\circ$	$\frac{1}{2}$ $1\frac{1}{2}$ $2\frac{1}{2}$ $3\frac{1}{2}$	 *669705* +x	

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O IV Observed Terms*

Config. $1s^2+$	Observed Terms			
$2s^2(^1S)2p$	$2p\ ^2P^\circ$			
$2s\ 2p^2$	$2p^2\ ^2S$; $2p^2\ ^4P$; $2p^2\ ^2P$; $2p^2\ ^2D$			
$2p^3$	$2p^3\ ^4S^\circ$; $2p^3\ ^2P^\circ$; $2p^3\ ^2D^\circ$			
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$	$nf\ (n\geq 4)$
$2s^2(^1S)nx$	$3\text{–}5s\ ^2S$	$3p\ ^2P^\circ$	$3\text{–}6d\ ^2D$	$5, 7, 8f\ ^2F^\circ$
$2s\ 2p(^3P^\circ)nx$	$3, 4s\ ^4P^\circ$ $3, 4s\ ^2P^\circ$	$3p\ ^4S$; $3, 4p\ ^2S$ $3p\ ^4P$; $3\text{–}5p\ ^2P$ $3p\ ^4D$; $3\text{–}5p\ ^2D$	$3\text{–}5d\ ^4P^\circ$; $3\text{–}5d\ ^2P^\circ$ $3\text{–}7d\ ^4D^\circ$; $3, 4d\ ^2D^\circ$ $3d\ ^4F^\circ$; $3\text{–}5d\ ^2F^\circ$	$4f\ ^2D$ $4f\ ^2F$
$2s\ 2p(^1P^\circ)nx'$	$3s'\ ^2P^\circ$	$3p'\ ^2S$; $3p'\ ^2P$; $3, 4p'\ ^2D$	$3d'\ ^2P^\circ$; $3, 4d'\ ^2D^\circ$; $3d'\ ^2F^\circ$	
$2p^2(^3P)nx''$	$3s''\ ^4P$	$3p''\ ^4S^\circ$; $3p''\ ^2S^\circ$ $3p''\ ^4P^\circ$ $3p''\ ^4D^\circ$; $3p''\ ^2D^\circ$	$3d''\ ^4P$; $3d''\ ^2D$; $3d''\ ^2F$	
$2p^2(^1D)nx'''$	$3s'''\ ^2D$	$3p'''\ ^2F^\circ$	$3d'''\ ^2S$; $3d'''\ ^2P$; $3d'''\ ^2D$; $3d'''\ ^2F$	

*For predicted terms in the spectra of the B I isoelectronic sequence, see Introduction.

O V

(Be I sequence; 4 electrons) Z=8

Ground state $1s^2 2s^2\ {}^1S_0$

$2s^2\ {}^1S_0$ **918702** cm^{-1} I. P. 113.873 volts

Edlén has revised and extended his published analysis and has generously furnished a manuscript copy of his complete term list in advance of publication, for inclusion here. He states that no intersystem combinations have been observed and that the relative uncertainty x in the position of the triplet terms with respect to the singlets may be $\pm 100\ cm^{-1}$.

In the published papers Edlén has used a prime to designate the terms from the $^2P^\circ$ limit in O VI.

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B. Edlén, unpublished material (Dec. 1947). (I P) (T)

O V

Config.	Desig.	J	Level	Interval
$2s^2$	$2s^2\ {}^1S$	0	0	
$2s(^2S)2p$	$2p\ {}^3P^\circ$	0	*82121.2*+x	136.7
		1	*82257.9*+x	306.2
		2	*82564.1*+x	
$2s(^2S)2p$	$2p\ {}^1P^\circ$	1	*158798*	
$2p^2$	$2p^2\ {}^3P$	0	213641.7+x	155.7
		1	213797.4+x	268.8
		2	214066.2+x	
$2p^2$	$2p^2\ {}^1D$	2	231722	
$2p^2$	$2p^2\ {}^1S$	0	287909	
$2s(^2S)3s$	$3s\ {}^3S$	1	547150.0+x	
$2s(^2S)3s$	$3s\ {}^1S$	0	561278	
$2s(^2S)3p$	$3p\ {}^1P^\circ$	1	*580826*	
$2s(^2S)3p$	$3p\ {}^3P^\circ$	0	*582983.6*+x	36.3
		1	*583019.9*+x	77.3
		2	*583097.2*+x	
$2s(^2S)3d$	$3d\ {}^3D$	1	600925.5+x	10.8
		2	600936.3+x	19.8
		3	600956.1+x	
$2s(^2S)3d$	$3d\ {}^1D$	2	612617	
$2p(^2P^\circ)3s$	$3s\ {}^3P^\circ$	0	*653099.7*+x	162.5
		1	*653262.2*+x	342.8
		2	*653605.0*+x	
$2p(^2P^\circ)3s$	$3s\ {}^1P^\circ$	1	*664486*	
$2p(^2P^\circ)3p$	$3p\ {}^1P$	1	672695	
$2p(^2P^\circ)3p$	$3p\ {}^3D$	1	677333 +x	199
		2	677532 +x	315
		3	677847 +x	

O V

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)3p$	$3p\ {}^3S$	1	684124 +x	
$2p(^2P^\circ)3p$	$3p\ {}^3P$	0	689585.6+x	114.0
		1	689699.6+x	190.7
		2	689890.3+x	
$2p(^2P^\circ)3d$	$3d\ {}^1D^\circ$	2	*694646*	
$2p(^2P^\circ)3p$	$3p\ {}^1D$	2	697170	
$2p(^2P^\circ)3d$	$3d\ {}^3D^\circ$	1	*704360* +x	64
		2	*704424* +x	103
		3	*704527* +x	
$2p(^2P^\circ)3p$	$3p\ {}^1S$	0	707630	
$2p(^2P^\circ)3d$	$3d\ {}^3P^\circ$	2	*708154* +x	−142
		1	*708296* +x	−83
		0	*708379* +x	
$2p(^2P^\circ)3d$	$3d\ {}^1F^\circ$	3	*712967*	
$2p(^2P^\circ)3d$	$3d\ {}^1P^\circ$	1	*719277*	
$2s(^2S)4s$	$4s\ {}^3S$	1	722666 +x	
$2s(^2S)4s$	$4s\ {}^1S$	0	731667	
$2s(^2S)4p$	$4p\ {}^3P^\circ$	0		
		1	*736108* +x	18
		2	*736126* +x	
$2s(^2S)4p$	$4p\ {}^1P^\circ$	1	*737883*	
$2s(^2S)4d$	$4d\ {}^3D$	1	742401 +x	6
		2	742407 +x	14
		3	742421 +x	
$2s(^2S)4d$	$4d\ {}^1D$	2	746280	
$2s(^2S)4f$	$4f\ {}^1F^\circ$	3	*749857*	
$2s(^2S)5s$	$5s\ {}^3S$	1	796263 +x	

O V—Continued

Config.	Desig.	J	Level		Interval
2s(^{2}S)5p	5p $^1P^{\circ}$	1	*802458*		
2s(^{2}S)5d	5d ^{3}D	1			
		2			
		3	806625	$+x$	
2s(^{2}S)5d	5d ^{1}D	2	808351		
2p($^2P^{\circ}$)4s	4s $^1P^{\circ}$	1	*824280*		
2p($^2P^{\circ}$)4p	4p ^{1}P	1	829588		
2p($^2P^{\circ}$)4p	4p ^{3}D	1	831047	$+x$	
		2	831213	$+x$	166
		3	831504	$+x$	291
2p($^2P^{\circ}$)4p	4p ^{3}S	1	832251	$+x$	
2p($^2P^{\circ}$)4p	4p ^{3}P	0			
		1	835151	$+x$	
		2	835321	$+x$	170
2p($^2P^{\circ}$)4d	4d $^1D^{\circ}$	2	*837834*		
2p($^2P^{\circ}$)4p	4p ^{1}D	2	837864		
2s(^{2}S)6p	6p $^1P^{\circ}$	1	*839616*		
2s(^{2}S)6f	6f $^1F^{\circ}$	3	*840832*		
2s(^{2}S)6d	6d ^{3}D	1			
		2			
		3	841220	$+x$	
2p($^2P^{\circ}$)4d	4d $^3D^{\circ}$	1	*841280*	$+x$	
		2	*841374*	$+x$	94
		3	*841497*	$+x$	123
2s(^{2}S)6d	6d ^{1}D	2	842105		
2p($^2P^{\circ}$)4d	4d $^3P^{\circ}$	2	*843290*	$+x$	
		1	*843397*	$+x$	−107
		0	*843449*	$+x$	−52
2p($^2P^{\circ}$)4d	4d $^1F^{\circ}$	3	*847129*		
2p($^2P^{\circ}$)4d	4d $^1P^{\circ}$	1	*847465*		

O V—Continued

Config.	Desig.	J	Level		Interval
2s(^{2}S)7p	7p $^1P^{\circ}$	1	*860874*		
2s(^{2}S)7d	7d ^{3}D	1			
		2			
		3	861975	$+x$	
2s(^{2}S)7d	7d ^{1}D	2	862419		
2s(^{2}S)8p	8p $^1P^{\circ}$	1	*874447*		
2s(^{2}S)8d	8d ^{3}D	1			
		2			
		3	875365	$+x$	
2p($^2P^{\circ}$)5p	5p ^{1}P	1	898580		
2p($^2P^{\circ}$)5p	5p ^{3}D	1			
		2			
		3	899671	$+x$	
2p($^2P^{\circ}$)5p	5p ^{3}P	0			
		1			
		2	901344	$+x$	
2p($^2P^{\circ}$)5p	5p ^{1}D	2	902442		
2p($^2P^{\circ}$)5d	5d $^1D^{\circ}$	2	*902592*		
2p($^2P^{\circ}$)5d	5d $^3D^{\circ}$	1			
		2			
		3	*904497*	$+x$	
2p($^2P^{\circ}$)5d	5d $^1F^{\circ}$	3	*906404*		
O VI ($^2S_{1/2}$)	*Limit*	--------	**918702**		
2p($^2P^{\circ}$)6p	6p ^{1}P	1	935093		
2p($^2P^{\circ}$)6p	6p ^{3}D	1			
		2			
		3	935945	$+x$	
2p($^2P^{\circ}$)6p	6p ^{3}P	0			
		1			
		2	936805	$+x$	
2p($^2P^{\circ}$)6p	6p ^{1}D	2	937341		

December 1947.

O V Observed Terms*

Config. $1s^2+$	Observed Terms			
$2s^2$	$2s^2$ ^{1}S			
2s(^{2}S)2p	2p $^3P^{\circ}$ 2p $^1P^{\circ}$			
$2p^2$	$2p^2$ ^{1}S $2p^2$ ^{3}P $2p^2$ ^{1}D			
	ns ($n\geq3$)	*np* ($n\geq3$)	*nd* ($n\geq3$)	*nf* ($n\geq4$)
2s(^{2}S)*nx*	3–5s ^{3}S 3, 4s ^{1}S	3, 4p $^3P^{\circ}$ 3–8p $^1P^{\circ}$	3–8d ^{3}D 3–7d ^{1}D	4, 6f $^1F^{\circ}$
2p($^2P^{\circ}$)*nx*	3s $^3P^{\circ}$ 3, 4s $^1P^{\circ}$	3, 4p ^{3}S 3p ^{1}S 3–6p ^{3}P 3–6p ^{1}P 3–6p ^{3}D 3–6p ^{1}D	3, 4d $^3P^{\circ}$ 3, 4d $^1P^{\circ}$ 3–5d $^3D^{\circ}$ 3–5d $^1D^{\circ}$ 3–5d $^1F^{\circ}$	

*For predicted terms in the spectra of the Be I isoelectronic sequence, see Introduction.

O VI

(Li I sequence; 3 electrons) **$Z=8$**

Ground state $1s^2\,2s\ ^2S_{1/2}$

$2s\ ^2S_{1/2}$ 1113999.5 cm^{-1} **I. P. 138.080 volts**

This spectrum has been analyzed by Edlén. The observed term values have all been taken from a manuscript generously furnished by him in advance of publication. He remarks that the $np\ ^2P^\circ$ and $nd\ ^2D$ series have been observed in the vacuum spark further than given in the table. For series members beyond $n=6$ he states that the term values calculated from a Ritz formula are probably to be preferred.

In the table, extrapolated intervals and calculated term values are entered in brackets. They have been taken from the 1933 and 1934 references below, as have also the entries in column one.

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B. Edlén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **9**, No. 6, 44 (1934). (T) (C L)
F. Tyrén, Nova Acta Reg. Soc. Sci. Uppsala [IV] **12**, No. 1, 24 (1940). (C L)
B. Edlén, unpublished material (Sept. 1947). (T)

O VI

Edlén	Config.	Desig.	J	Level	Interval
$2s\ ^2S_1$	$2s$	$2s\ ^2S$	½	0.0	
$2p\ ^2P_1$	$2p$	$2p\ ^2P^\circ$	½	*96375.0*	532.5
$^2P_2$			1½	*96907.5*	
$3s\ ^2S_1$	$3s$	$3s\ ^2S$	½	640039.8	
$3p\ ^2P_1$	$3p$	$3p\ ^2P^\circ$	½	*666113.2*	156.6
$^2P_2$			1½	*666269.8*	
$3d\ ^2D_2$	$3d$	$3d\ ^2D$	1½	674625.7	51.1
$^2D_3$			2½	674676.8	
$4s\ ^2S_1$	$4s$	$4s\ ^2S$	½	852696	
$4p\ ^2P_1$	$4p$	$4p\ ^2P^\circ$	½	*863333.8*	63.9
$^2P_2$			1½	*863397.7*	
$4d\ ^2D_2$	$4d$	$4d\ ^2D$	1½	866880.1	21.4
$^2D_3$			2½	866901.5	
$4f\ ^2F_3$	$4f$	$4f\ ^2F^\circ$	2½	*867077.7*	9.8
$^2F_4$			3½	*867087.5*	
	$5s$	$5s\ ^2S$	½	948690	
$5p\ ^2P_2$	$5p$	$5p\ ^2P^\circ$	{½, 1½}	*954080*	[33]
$5d\ ^2D_3$	$5d$	$5d\ ^2D$	{1½, 2½}	955856	[11]
6 S	$6s$	$6s\ ^2S$	½	1000080	
6 P	$6p$	$6p\ ^2P^\circ$	{½, 1½}	*1003130*	
$6d\ ^2D_3$	$6d$	$6d\ ^2D$	{1½, 2½}	1004178	

O VI

Edlén	Config.	Desig.	J	Level	Interval
6 F	$6f$	$6f\ ^2F^\circ$	{2½, 3½}	[*1004265*]	
6 GH	$6g$, $6h$	$6g\ ^2G$, etc.	{3½ to 5½}	[1004276]	
7 S	$7s$	$7s\ ^2S$	½	1030780	
7 P	$7p$	$7p\ ^2P^\circ$	{½, 1½}	*1032630*	
7 D	$7d$	$7d\ ^2D$	{1½, 2½}	1033324	
7 F	$7f$	$7f\ ^2F^\circ$	{2½, 3½}	[*1033382*]	
7 GHI	$7g$, etc.	$7g\ ^2G$, etc.	{3½ to 6½}	[1033389]	
8 S	$8s$	$8s\ ^2S$	½	[1050543]	
8 P	$8p$	$8p\ ^2P^\circ$	{½, 1½}	*1051724*	
8 F	$8f$	$8f\ ^2F^\circ$	{2½, 3½}	[*1052280*]	
8 GHIK	$8g$, etc.	$8g\ ^2G$, etc.	{3½ to 7½}	[1052285]	
8 D	$8d$	$8d\ ^2D$	{1½, 2½}	1052296	
	O VII ($^1S_0$)	*Limit*	------	**1113999.5**	

September 1947.

O VII

(He I sequence; 2 electrons) **$Z=8$**

Ground State $1s^2\ {}^1S_0$

$1s^2\ {}^1S_0$ 5963000±600 cm^{-1} **I. P. 739.114 ±0.074 volts**

Five singlet lines have been observed by Tyrén in the interval 17 A to 21 A. He has also observed one intersystem combination—a line at 21.804 A classified as $1s^2\ {}^1S_0-2p\ {}^3P^\circ_1$. His unit 10^3 cm^{-1} has here been changed to cm^{-1}.

The triplet terms are from Edlén, who has kindly furnished them in advance of publication. He remarks that the extrapolated absolute term values of the triplets relative to those of the singlets confirm the intersystem combination reported by Tyrén. The $2s\ {}^3S-2p\ {}^3P^\circ$ combination has apparently not been observed, but Edlén regards the extrapolation from the irregular doublet law as very reliable. Brackets are used in the table to indicate extrapolated values not yet confirmed by observation.

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B. Edlén, unpublished material (Sept. 1947). (T)

O VII

Config.	Desig.	J	Level	Interval
$1s^2$	$1s^2\ {}^1S$	0	0	
$1s\,2s$	$2s\ {}^3S$	1	4525340	
$1s\,2p$	$2p\ {}^3P^\circ$	0	[4586170]	
		1	*4586230*	[60]
		2	[4586780]	[550]
$1s\,2p$	$2p\ {}^1P^\circ$	1	*4629200*	
$1s\,3p$	$3p\ {}^3P^\circ$	0, 1, 2	*5356380*	
$1s\,3d$	$3d\ {}^3D$	3, 2, 1	5364990	

O VII

Config.	Desig.	J	Level	Interval
$1s\,3p$	$3p\ {}^1P^\circ$	1	*5368550*	
$1s\,4p$	$4p\ {}^1P^\circ$	1	*5628100*	
$1s\,5p$	$5p\ {}^1P^\circ$	1	*5748450*	
$1s\,6p$	$6p\ {}^1P^\circ$	1	*5813950*	
O VIII ($^2S_{1/2}$)	*Limit*	--------	**5963000**	

September 1947.

O VIII

(H I sequence; 1 electron) **$Z=8$**

Ground state $1s\ {}^2S_{1/2}$

$1s\ {}^2S_{1/2}$ cm^{-1} **I. P. volts**

Tyrén has observed the Lyman line $1s\ {}^2S-2p\ {}^2P^\circ$ of O VIII. The calculated position of this line, 18.967 A, places the $2p\ {}^2P^\circ$ term at 5272315 cm^{-1} above the ground term $1s\ {}^2S_{1/2}=0$.

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November 1946.

FLUORINE

F I

9 electrons **$Z=9$**

Ground state $1s^2\ 2s^2\ 2p^5\ {}^2P^{\circ}_{1\frac{1}{2}}$

$2p^5\ {}^2P^{\circ}_{1\frac{1}{2}}$ *140553.5* cm^{-1} **I. P. 17.42 volts**

This spectrum is incompletely analyzed, but the terms from the ${}^3P$ limit in F II are fairly well established. The terms listed have been taken from Edlén's later paper, supplemented by unpublished levels from further analysis by Lidén. The new levels have been generously furnished in manuscript form by Edlén, for inclusion here.

Intersystem combinations have been observed, connecting the doublet and quartet terms.

Edlén remarks that it is impossible to assign term designations to the levels labeled $3d$ X and $4d$ X, because of the departure from *LS*-coupling. He also states that the terms from ${}^1D$ in F II need further confirmation. They are connected with the rest by only two ultraviolet lines, those observed by Bowen at 806.92 A and 809.60 A.

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F I

Edlén	Config.	Desig.	J	Level	Interval
$2p\ {}^2P_2$	$2s^2\ 2p^5$	$2p^5\ {}^2P^{\circ}$	1½	*0.0*	−404.0
${}^2P_1$			½	*404.0*	
$3s\ {}^4P_3$	$2s^2\ 2p^4({}^3P)3s$	$3s\ {}^4P$	2½	102406.50	−274.74
${}^4P_2$			1½	102681.24	−159.96
${}^4P_1$			½	102841.20	
$3s\ {}^2P_2$	$2s^2\ 2p^4({}^3P)3s$	$3s\ {}^2P$	1½	104731.86	−325.24
${}^2P_1$			½	105057.10	
$3p\ {}^4P_3$	$2s^2\ 2p^4({}^3P)3p$	$3p\ {}^4P^{\circ}$	2½	*115918.70*	−122.99
${}^4P_2$			1½	*116041.69*	−102.70
${}^4P_1$			½	*116144.39*	
$3p\ {}^4D_4$	$2s^2\ 2p^4({}^3P)3p$	$3p\ {}^4D^{\circ}$	3½	*116988.21*	−176.62
${}^4D_3$			2½	*117164.83*	−144.54
${}^4D_2$			1½	*117309.37*	−83.40
${}^4D_1$			½	*117392.77*	
$3p\ {}^2D_3$	$2s\ 2p^4({}^3P)3p$	$3p\ {}^2D^{\circ}$	2½	*117623.73*	−250.02
${}^2D_2$			1½	*117873.75*	
$3p\ {}^2S_1$	$2s^2\ 2p^4({}^3P)3p$	$3p\ {}^2S^{\circ}$	½	*118406.09*	
$3p\ {}^4S_2$	$2s^2\ 2p^4({}^3P)3p$	$3p\ {}^4S^{\circ}$	1½	*11842*[illegible]	
$3p\ {}^2P_2$	$2s^2\ 2p^4({}^3P)3p$	$3p\ {}^2P^{\circ}$	1½	*11893*[illegible]	−145.02
${}^2P_1$			½	*119082.63*	
$\overline{3s}\ {}^2D_3$	$2s^2\ 2p^4({}^1D)3s$	$3s'\ {}^2D$	2½	123925.50	−1.06
${}^2D_2$			1½	123926.56	
$3d\ {}^4D_4$	$2s^2\ 2p^4({}^3P)3d$	$3d\ {}^4D$	3½	128064.90	−23.73
${}^4D_3$			2½	128088.63	−34.88
${}^4D_2$			1½	128123.51	−62.29
${}^4D_1$			½	128185.80	

F I—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3d\ X_8$	$2s^2\,2p^4(^3P)3d$	$3d\ Z_4$		128141. 27	
$3d\ ^4F_5$ $^4F_4$ $^4F_3$ $^4F_2$	$2s^2\,2p^4(^3P)3d$	$3d\ ^4F$	4½ 3½ 2½ 1½	128219. 92 128515. 55 128526. 15 128612. 73	−295. 63 −10. 60 −86. 58
$3d\ X_7$	$2s^2\,2p^4(^3P)3d$	$3d\ Z_3$		128220. 65	
$3d\ X_6$	$2s^2\,2p^4(^3P)3d$	$3d\ Z_2$		128221. 16	
$3d\ X_5$	$2s^2\,2p^4(^3P)3d$	$3d\ Y_3$		128339. 53	
$3d\ X_4$	$2s^2\,2p^4(^3P)3d$	$3d\ Y_2$	1½	128524. 09	
$3d\ X_3$	$2s^2\,2p^4(^3P)3d$	$3d\ Y_1$		128606. 88	
$3d\ X_2$	$2s^2\,2p^4(^3P)3d$	$3d\ X_2$		128698. 68	
$3d\ X_1$	$2s^2\,2p^4(^3P)3d$	$3d\ X_1$		128713. 12	
	$2s^2\,2p^4(^3P)5s$	$5s\ ^4P$	2½ 1½ ½	132596. 26 132745. 77 133009. 96	−149. 51 −264. 19
	$2s^2\,2p^4(^3P)5s$	$5s\ ^2P$	1½ ½	132999. 16 133224. 10	−224. 94
	$2s^2\,2p^4(^3P)4d$	$4d\ ^4D$	3½ 2½ 1½ ½	133545. 27 133558. 14 133578. 15 133614. 10	−12. 87 −20. 01 −35. 95
	$2s^2\,2p^4(^3P)4d$	$4d\ Z_4$		133584. 35	

F I—Continued

Edlén	Config.	Desig.	J	Level	Interval
	$2s^2\,2p^4(^3P)4d$	$4d\ ^4F$	4½ 3½ 2½ 1½	133606. 39 133923. 83 133932. 56 133972. 06	−317. 44 −8. 73 −39. 50
	$2s^2\,2p^4(^3P)4d$	$4d\ Z_3$		133607. 33	
	$2s^2\,2p^4(^3P)4d$	$4d\ Z_2$		133624. 61	
	$2s^2\,2p^4(^3P)4d$	$4d\ Z_1$		133644. 4	
	$2s^2\,2p^4(^3P)4d$	$4d\ Y_3$		133911. 08	
	$2s^2\,2p^4(^3P)4d$	$4d\ Y_2$		133920. 20	
	$2s^2\,2p^4(^3P)4d$	$4d\ Y_1$		133966. 47	
	$2s^2\,2p^4(^3P)4d$	$4d\ X_2$		134085. 53	
	$2s^2\,2p^4(^3P)4d$	$4d\ X_1$		134092. 03	
$\overline{3p}\ ^2F_3$ $^2F_4$	$2s^2\,2p^4(^1D)3p$	$3p'\ ^2F°$	2½ 3½	*137594. 63* *137603. 44*	8. 81
$\overline{3p}\ ^2D_2$ $^2D_3$	$2s^2\,2p^4(^1D)3p$	$3p'\ ^2D°$	1½ 2½	*138700. 15* *138708. 01*	7. 86
	F II ($^3P_2$)	*Limit*	------	***140553. 5***	
$2p'\ ^2S_1$	$2s\,2p^6$	$2p^6\ ^2S$	½	[168554]	

December 1947.

F I Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2\,2p^5$	$2p^5\ ^2P°$		
	ns ($n\geq 3$)	*np* ($n\geq 3$)	*nd* ($n\geq 3$)
$2s^2\,2p^4(^3P)nx$	{ $3, 5s\ ^4P$ { $3, 5s\ ^2P$	$3p\ ^4S°$ $3p\ ^4P°$ $3p\ ^4D°$ $3p\ ^2S°$ $3p\ ^2P°$ $3p\ ^2D°$	$3, 4d\ ^4D$ $3, 4d\ ^4F$
$2s^2\,2p^4(^1D)nx'$	$3s'\ ^2D$	$3p'\ ^2D°$ $3p'\ ^2F°$	

*For predicted terms in the spectra of the F I isoelectronic sequence, see Introduction.

761538°—48——5

F II

(O I sequence; 8 electrons) $Z=9$

Ground state $1s^2\ 2s^2\ 2p^4\ ^3P_2$

$2p^4\ ^3P_2$ **282190.2** cm^{-1} **I. P. 34.98 volts**

Bowen, Dingle, and Edlén have all contributed to the analysis of this spectrum. The singlet and triplet terms are taken from Edlén, who has revised and extended the earlier work. The quintet terms, except $5f\ ^5F$, are from Dingle's paper. The term $5f\ ^5F$ derived by Edlén agrees well with the $4f\ ^5F$ term and Dingle's series limit.

The singlet and triplet terms are connected by intersystem combinations. The relative position of the quintets is determined by the series with the uncertainty x probably not exceeding 200 cm^{-1}.

Edlén lists a number of combinations that probably involve $2s^2\ 2p^3(^2D^\circ)4f$ terms at about $288600\pm$cm^{-1} above the ground state.

In a private communication Edlén has stated that his term published as $\overline{\overline{3d}}\ ^3D$ should have the designation $\overline{\overline{4s}}\ ^3P$. He has also revised his published value of $3d'\ ^1S^\circ$.

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F II

Edlén	Config.	Desig.	J	Level	Interval
$2p\ ^3P_2$	$2s^2\ 2p^4$	$2p^4\ ^3P$	2	0.0	−341.8
$^3P_1$			1	341.8	−148.8
$^3P_0$			0	490.6	
$2p\ ^1D_2$	$2s^2\ 2p^4$	$2p^4\ ^1D$	2	20873	
$2p\ ^1S_0$	$2s^2\ 2p^4$	$2p^4\ ^1S$	0	44919	
$2p'\ ^3P_2$	$2s\ 2p^5$	$2p^5\ ^3P^\circ$	2	*164797.7*	−309.4
$^3P_1$			1	*165107.1*	−173.9
$^3P_0$			0	*165281.0*	
	$2s^2\ 2p^3(^4S^\circ)3s$	$3s\ ^5S^\circ$	2	*176654.2* $+x$	
$3s\ ^3S_1$	$2s^2\ 2p^3(^4S^\circ)3s$	$3s\ ^3S^\circ$	1	*182865.2*	
	$2s^2\ 2p^3(^4S^\circ)3p$	$3p\ ^5P$	1	202609.65$+x$	11.33
			2	202620.98$+x$	19.55
			3	202640.53$+x$	
$3p\ ^3P_0$	$2s^2\ 2p^3(^4S^\circ)3p$	$3p\ ^3P$	0	207702.91	−3.00
$^3P_1$			1	207699.91	4.70
$^3P_2$			2	207704.61	
$\overline{3s}\ ^3D_3$	$2s^2\ 2p^3(^2D^\circ)3s$	$3s'\ ^3D^\circ$	3	*211866.62*	−21.07
$^3D_2$			2	*211887.69*	−13.03
$^3D_1$			1	*211900.72*	
$\overline{3s}\ ^1D_2$	$2s^2\ 2p^3(^2D^\circ)3s$	$3s'\ ^1D^\circ$	2	*215069.8*	
$\overline{\overline{3s}}\ ^1P_1$	$2s^2\ 2p^3(^2P^\circ)3s$	$3s''\ ^1P^\circ$	1	*227228.2*	
$\overline{\overline{3s}}\ ^3P_2$	$2s^2\ 2p^3(^2P^\circ)3s$	$3s''\ ^3P^\circ$	2	*229550.83*	−1.61
$^3P_1$			1	*229552.44*	−2.66
$^3P_0$			0	*229555.10*	
	$2s^2\ 2p^3(^4S^\circ)3d$	$3d\ ^5D^\circ$	4	*231158.08*$+x$	−0.91
			3	*231158.99*$+x$	−1.20
			2	*231160.19*$+x$	−0.68
			1	*231160.87*$+x$	−0.52
			0	*231161.39*$+x$	
$3d\ ^3D_1$	$2s^2\ 2p^3(^4S^\circ)3d$	$3d\ ^3D^\circ$	1	*232064.18*	0.80
$^3D_2$			2	*232064.98*	2.08
$^3D_3$			3	*232067.06*	
	$2s^2\ 2p^3(^4S^\circ)4s$	$4s\ ^5S^\circ$	2	*235311.15*$+x$	
$\overline{3p}\ ^1P_1$	$2s^2 2p^3(^2D^\circ)3p$	$3p'\ ^1P$	1	235643.1	
$\overline{3p}\ ^3D_1$	$2s^2 2p^3(^2D^\circ)3p$	$3p'\ ^3D$	1	236170.35	2.72
$^3D_2$			2	236173.07	22.50
$^3D_3$			3	236195.57	
$4s\ ^3S_1$	$2s^2\ 2p^3(^4S^\circ)4s$	$4s\ ^3S^\circ$	1	*236961.63*	
$\overline{3p}\ ^3F_4$	$2s^2 2p^3(^2D^\circ)3p$	$3p'\ ^3F$	4	237507.91	−0.81
$^3F_3$			3	237508.72	−0.65
$^3F_2$			2	237509.37	
$\overline{3p}\ ^1F_3$	$2s^2 2p^3(^2D^\circ)3p$	$3p'\ ^1F$	3	238323.6	
$2p'\ ^1P_1$	$2s\ 2p^5$	$2p^5\ ^1P^\circ$	1	*239605.0*	
$\overline{3p}\ ^3P_2$	$2s^2 2p^3(^2D^\circ)3p$	$3p'\ ^3P$	2	240093.10	−60.24
$^3P_1$			1	240153.34	−26.57
$^3P_0$			0	240179.91	
$\overline{3p}\ ^1D_2$	$2s^2 2p^3(^2D^\circ)3p$	$3p'\ ^1D$	2	246283.9	
$4p\ ^3P_0$	$2s^2\ 2p^3(^4S^\circ)4p$	$4p\ ^3P$	0	246655.10	7.45
$^3P_1$			1	246662.55	20.12
$^3P_2$			2	246682.67	
$\overline{\overline{3p}}\ ^3S_1$	$2s^2\ 2p^3(^2P^\circ)3p$	$3p''\ ^3S$	1	253313.2	

F II—Continued

Edlén	Config.	Desig.	J	Level	Interval
	$2s^2 2p^3(^4S^\circ)4d$	$4d\ ^3D^\circ$	1 2		
$4d\ ^3D_3$			3	254016	
$4f\ ^3F$	$2s^2 2p^3(^4S^\circ)4f$	$4f\ ^3F$	4, 3, 2	254547. 3	
$\overline{\overline{3p}}\ ^3D_3$ $^3D_2$ $^3D_1$	$2s^2 2p^3(^2P^\circ)3p$	$3p''\ ^3D$	3 2 1	254702. 30 254717. 36 254723. 96	−15. 06 −6. 60
	$2s^2 2p^3(^4S^\circ)4f$	$4f\ ^5F$	5 to 1	254703. 1+x	
$\overline{\overline{3p}}\ ^1P_1$	$2s^2 2p^3(^2P^\circ)3p$	$3p''\ ^1P$	1	255606. 0	
$\overline{\overline{\overline{3p}}}\ ^3P_0$ $^3P_1$ $^3P_2$	$2s^2 2p^3(^2P^\circ)3p$	$3p''\ ^3P$	0 1 2	257253. 9 257268. 8 257292. 7	14. 9 23. 9
$\overline{\overline{3p}}\ ^1D_2$	$2s^2 2p^3(^2P^\circ)3p$	$3p''\ ^1D$	2	258930	
$5f\ ^5F$	$2s^2 2p^3(^4S^\circ)5f$	$5f\ ^5F$	5 to 1	264610 +x	
$\overline{3d}\ ^3F_2$ $^3F_3$ $^3F_4$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^3F^\circ$	2 3 4	264953. 12 264958. 63 264965. 91	5. 51 7. 28
$\overline{3d}\ ^1S_0$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^1S^\circ$	0	264994. 9	
$\overline{3d}\ ^3G_5$ $^3G_4$ $^3G_3$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^3G^\circ$	5 4 3	265255. 8 265267. 8 265289. 3	−12. 0 −21. 5
$\overline{3d}\ ^1G_4$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^1G^\circ$	4	265310. 1	
$\overline{3d}\ ^3D_3$ $^3D_2$ $^3D_1$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^3D^\circ$	3 2 1	265472. 70 265498. 74 265517. 14	−26. 04 −18. 40
$\overline{3d}\ ^1D_2$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^1D^\circ$	2	266270. 2	
$\overline{\overline{3p}}\ ^1S_0$	$2s^2 2p^3(^2P^\circ)3p$	$3p''\ ^1S$	0	266338. 4	
$\overline{3d}\ ^3S_1$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^3S^\circ$	1	266360. 69	
$\overline{3d}\ ^3P_2$ $^3P_1$ $^3P_0$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^3P^\circ$	2 1 0	266454. 27 266499. 12 266516. 35	−44. 85 −17. 23
$\overline{3d}\ ^1F_3$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^1F^\circ$	3	266548. 7	
$\overline{3d}\ ^1P_1$	$2s^2 2p^3(^2D^\circ)3d$	$3d'\ ^1P^\circ$	1	267400. 3	
$\overline{4s}\ ^3D_3$ $^3D_2$ $^3D_1$	$2s^2 2p^3(^2D^\circ)4s$	$4s'\ ^3D^\circ$	3 2 1	269548. 7 269564. 2 269574. 5	−15. 5 −10. 3
$\overline{4s}\ ^1D_2$	$2s^2 2p^3(^2D^\circ)4s$	$4s'\ ^1D^\circ$	2	270508. 4	
	F III ($^4S^\circ_{1\frac{1}{2}}$)	*Limit*	------	282190. 2	
$\overline{\overline{3d}}\ ^3F_4$ $^3F_3$ $^3F_2$	$2s^2 2p^3(^2P^\circ)3d$	$3d''\ ^3F^\circ$	4 3 2	282544. 7 282569. 7 282586. 9	−25. 0 −17. 2
$\overline{\overline{3d}}\ ^1D_2$	$2s^2 2p^3(^2P^\circ)3d$	$3d''\ ^1D^\circ$	2	282774. 7	
$\overline{\overline{3d}}\ ^3P_0$ $^3P_1$ $^3P_2$	$2s^2 2p^3(^2P^\circ)3d$	$3d''\ ^3P^\circ$	0 1 2	282897. 0 282915. 4 282947. 9	16. 4 34. 5
$\overline{\overline{3d}}\ ^1F_3$	$2s^2 2p^3(^2P^\circ)3d$	$3d''\ ^1F^\circ$	3	283409. 4	
$\overline{\overline{3d}}\ ^1P_1$	$2s^2 2p^3(^2P^\circ)3d$	$3d''\ ^1P^\circ$	1	284224. 8	
$\overline{\overline{\overline{3d}}}\ ^3D_3$ $^3D_2$ $^3D_1$	$2s^2 2p^3(^2P^\circ)4s$	$4s''\ ^3P^\circ$	2 1 0	286701. 9 286706. 6 286707. 3	−4. 7 −0. 7

December 1947.

F II Observed Terms*

Config. $1s^2+$	Observed Terms			
$2s^2 2p^4$	$2p^4\ ^1S$; $2p^4\ ^3P$; $2p^4\ ^1D$			
$2s\ 2p^5$	$2p^5\ ^3P^\circ$ $2p^5\ ^1P^\circ$			
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$	$nf\ (n\geq 4)$
$2s^2 2p^3(^4S^\circ)nx$	$3, 4s\ ^5S^\circ$ $3, 4s\ ^3S^\circ$	$3p\ ^5P$ $3, 4p\ ^3P$	$3d\ ^5D^\circ$ $3, 4d\ ^3D^\circ$	$4, 5f\ ^5F$ $4f\ ^3F$
$2s^2 2p^3(^2D^\circ)nx'$	$3, 4s'\ ^3D^\circ$ $3, 4s'\ ^1D^\circ$	$3p'\ ^3P$ $3p'\ ^3D$ $3p'\ ^3F$ $3p'\ ^1P$ $3p'\ ^1D$ $3p'\ ^1F$	$3d'\ ^3S^\circ$ $3d'\ ^3P^\circ$ $3d'\ ^3D^\circ$ $3d'\ ^3F^\circ$ $3d'\ ^3G^\circ$ $3d'\ ^1S^\circ$ $3d'\ ^1P^\circ$ $3d'\ ^1D^\circ$ $3d'\ ^1F^\circ$ $3d'\ ^1G^\circ$	
$2s^2 2p^3(^2P^\circ)nx''$	$3, 4s''\ ^3P^\circ$ $3s''\ ^1P^\circ$	$3p''\ ^3S$ $3p''\ ^3P$ $3p''\ ^3D$ $3p''\ ^1S$ $3p''\ ^1P$ $3p''\ ^1D$	$3d''\ ^3P^\circ$ $3d''\ ^3F^\circ$ $3d''\ ^1P^\circ$ $3d''\ ^1D^\circ$ $3d''\ ^1F^\circ$	

*For predicted terms in the spectra of the O I isoelectronic sequence, see Introduction.

F III

(N I sequence; 7 electrons) $Z=9$

Ground state $1s^2\ 2s^2\ 2p^3\ {}^4S^\circ_{1\frac{1}{2}}$

$2p^3\ {}^4S^\circ_{1\frac{1}{2}}$ ***505410*** cm^{-1} I. P. 62.646 volts

The terms are from the paper by Edlén. With the aid of observations in the extreme ultraviolet he has extended the analysis by Bowen and Dingle and derived improved values of the series limits. He has found the sextet terms and estimated their position relative to the other terms. The value of x is somewhat uncertain. Bowen found 14 intersystem combinations connecting the doublet and quartet terms.

The term $3p''\ {}^2P^\circ$ depends upon the combination with $3s''\ {}^2S$, assigned to a pair of lines at 2920 A. According to Edlén this classification is somewhat uncertain.

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I. S. Bowen, Phys. Rev. **45**, 82 (1934). (T) (C L)
B. Edlén, Zeit. Phys. **93**, 433 (1935). (I P) (T) (C L)

F III

Edlén	Config.	Desig.	J	Level	Interval
$2p\ {}^4S_2$	$2s^2\ 2p^3$	$2p^3\ {}^4S^\circ$	1½	*0*	
$2p\ {}^2D_3$	$2s^2\ 2p^3$	$2p^3\ {}^2D^\circ$	2½	*34084*	−36
${}^2D_2$			1½	*34120*	
$2p\ {}^2P_{12}$	$2s^2\ 2p^3$	$2p^3\ {}^2P^\circ$	{1½, ½}	*51558*	
$2p'\ {}^4P_3$	$2s\ 2p^4$	$2p^4\ {}^4P$	2½	151897. 9	−337. 4
${}^4P_2$			1½	152235. 3	−174. 7
${}^4P_1$			½	152410. 0	
$2p'\ {}^2D_3$	$2s\ 2p^4$	$2p^4\ {}^2D$	2½	210240	−16
${}^2D_2$			1½	210256	
$2p'\ {}^2S_1$	$2s\ 2p^4$	$2p^4\ {}^2S$	½	248260	
$2p'\ {}^2P_2$	$2s\ 2p^4$	$2p^4\ {}^2P$	1½	266559	−384
${}^2P_1$			½	266943	
$3s\ {}^4P_1$	$2s^2\ 2p^2({}^3P)3s$	$3s\ {}^4P$	½	316707. 3	211. 3
${}^4P_2$			1½	316918. 6	318. 9
${}^4P_3$			2½	317237. 5	

F III

Edlén	Config.	Desig.	J	Level	Interval
$3s\ {}^2P_1$	$2s^2\ 2p^2({}^3P)3s$	$3s\ {}^2P$	½	324489. 9	384. 5
${}^2P_2$			1½	324874. 4	
$\overline{3s}\ {}^2D_3$	$2s^2\ 2p^2({}^1D)3s$	$3s'\ {}^2D$	2½	344016. 2	−3. 3
${}^2D_2$			1½	344019. 5	
$3p\ {}^2S_1$	$2s^2\ 2p^2({}^3P)3p$	$3p\ {}^2S^\circ$	½	*344438. 4*	
$3p\ {}^4D_1$	$2s^2\ 2p^2({}^3P)3p$	$3p\ {}^4D^\circ$	½	*348700. 5*	114. 9
${}^4D_2$			1½	*348815. 4*	189. 7
${}^4D_3$			2½	*349005. 1*	258. 9
${}^4D_4$			3½	*349264. 0*	
$3p\ {}^4P_1$	$2s^2\ 2p^2({}^3P)3p$	$3p\ {}^4P^\circ$	½	*351234. 1*	94. 3
${}^4P_2$			1½	*351328. 4*	188. 7
${}^4P_3$			2½	*351517. 1*	
$3p\ {}^2D_2$	$2s^2\ 2p^2({}^3P)3p$	$3p\ {}^2D^\circ$	1½	*355979. 6*	390. 4
${}^2D_3$			2½	*356370. 0*	
$3p\ {}^4S_2$	$2s^2\ 2p^2({}^3P)3p$	$3p\ {}^4S^\circ$	1½	*357477. 0*	

F III—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3p\ ^2P_1$	$2s^2\ 2p^2(^3P)3p$	$3p\ ^2P^\circ$	½	*360346.2*	86.9
$^2P_2$			1½	*360433.1*	
$\overline{\overline{3s}}\ ^2S_1$	$2s^2\ 2p^2(^1S)3s$	$3s''\ ^2S$	½	372673.0	
$\overline{3p}\ ^2F_3$	$2s^2\ 2p^2(^1D)3p$	$3p'\ ^2F^\circ$	2½	*376806.2*	64.8
$^2F_4$			3½	*376871.0*	
$\overline{3p}\ ^2D_3$	$2s^2\ 2p^2(^1D)3p$	$3p'\ ^2D^\circ$	2½	*380242.9*	−56.2
$^2D_2$			1½	*380299.1*	
$\overline{3p}\ ^2P_1$	$2s^2\ 2p^2(^1D)3p$	$3p'\ ^2P^\circ$	½	*384350.9*	134.3
$^2P_2$			1½	*384485.2*	
$3d\ ^4F_2$	$2s^2\ 2p^2(^3P)3d$	$3d\ ^4F$	1½	387257.3	108.9
$^4F_3$			2½	387366.2	155.6
$^4F_4$			3½	387521.8	203.7
$^4F_5$			4½	387725.5	
$3d\ ^2P_2$	$2s^2\ 2p^2(^3P)3d$	$3d\ ^2P$	1½	389523.5	−212.2
$^2P_1$			½	389735.7	
$3d\ ^4D_1$	$2s^2\ 2p^2(^3P)3d$	$3d\ ^4D$	½	390118.4	−40.1
$^4D_2$			1½	390078.3	−2.6
$^4D_3$			2½	390075.7	132.7
$^4D_4$			3½	390208.4	
$3d\ ^4P_3$	$2s^2\ 2p^2(^3P)3d$	$3d\ ^4P$	2½	390832.3	−141.7
$^4P_2$			1½	390974.0	−71.2
$^4P_1$			½	391045.2	
$3d\ ^2F_3$	$2s^2\ 2p^2(^3P)3d$	$3d\ ^2F$	2½	391255.6	369.9
$^2F_4$			3½	391625.5	
$3s'\ ^6S_3$	$2s\ 2p^3(^5S^\circ)3s$	$3s'''\ ^6S^\circ$	2½	*391910.0* $+x$	
$3d\ ^2D_2$	$2s^2\ 2p^2(^3P)3d$	$3d\ ^2D$	1½	395266.1	118.0
$^2D_3$			2½	395384.1	
$2p''\ ^2P_2$	$2p^5$	$2p^5\ ^2P^\circ$	1½	*401203*	−518
$^2P_1$			½	*401721*	
$3s'\ ^4S_2$	$2s\ 2p^3(^5S^\circ)3s$	$3s'''\ ^4S^\circ$	1½	*404778*	
$\overline{\overline{3p}}\ ^2P_1$	$2s^2\ 2p^2(^1S)3p$	$3p''\ ^2P^\circ$	½	*406899.2*	4.1
$^2P_2$			1½	*406903.3*	
$\overline{3d}\ ^2F_4$	$2s^2\ 2p^2(^1D)3d$	$3d'\ ^2F$	3½	413136.1	−51.0
$^2F_3$			2½	413187.1	
$\overline{3d}\ ^2G_5$	$2s^2\ 2p^2(^1D)3d$	$3d'\ ^2G$	4½	414887.0	−3.1
$^2G_4$			3½	414890.1	
$4s\ ^4P_1$	$2s^2\ 2p^2(^3P)4s$	$4s\ ^4P$	½	415188	
$^4P_2$			1½		
$^4P_3$			2½	415714	
$\overline{3d}\ ^2D_2$	$2s^2\ 2p^2(^1D)3d$	$3d'\ ^2D$	1½	416160.7	17.4
$^2D_3$			2½	416178.1	
$4s\ ^2P_1$	$2s^2\ 2p^2(^3P)4s$	$4s\ ^2P$	½	417581	387
$^2P_2$			1½	417968	
$\overline{3d}\ ^2P_1$	$2s^2\ 2p^2(^1D)3d$	$3d'\ ^2P$	½	418180.6	60.3
$^2P_2$			1½	418240.9	
$\overline{3d}\ ^2S_1$	$2s^2\ 2p^2(^1D)3d$	$3d'\ ^2S$	½	420997.9	
$3p'\ ^6P_2$	$2s\ 2p^3(^5S^\circ)3p$	$3p'''\ ^6P$	1½	425239.6 $+x$	21.7
$^6P_3$			2½	425261.3 $+x$	36.1
$^6P_4$			3½	425297.4 $+x$	
$4p\ ^2S_1$	$2s^2\ 2p^2(^3P)4p$	$4p\ ^2S^\circ$	½	*425388.9*	

F III—Continued

Edlén	Config.	Desig.	J	Level	Interval
$4p\ ^4D_1$	$2s^2\ 2p^2(^3P)4p$	$4p\ ^4D^\circ$	½	*426426.0*	130.4
$^4D_2$			1½	*426556.4*	174.3
$^4D_3$			2½	*426730.7*	256.8
$^4D_4$			3½	*426987.5*	
$4p\ ^4P_1$	$2s^2\ 2p^2(^3P)4p$	$4p\ ^4P^\circ$	½	*427456.7*	85.7
$^4P_2$			1½	*427542.4*	186.9
$^4P_3$			2½	*427729.3*	
$4p\ ^2D_2$	$2s^2\ 2p^2(^3P)4p$	$4p\ ^2D^\circ$	1½	*429105.3*	395.3
$^2D_3$			2½	*429500.6*	
$4p\ ^2P_1$	$2s^2\ 2p^2(^3P)4p$	$4p\ ^2P^\circ$	½	*431057.1*	167.1
$^2P_2$			1½	*431224.2*	
$3p'\ ^4P_3$	$2s\ 2p^3(^5S^\circ)3p$	$3p'''\ ^4P$	2½	434546.3	−20.7
$^4P_2$			1½	434567.0	−14.6
$^4P_1$			½	434581.6	
$\overline{4s}\ ^2D_{23}$	$2s^2\ 2p^2(^1D)4s$	$4s'\ ^2D$	{2½, 1½}	440830	
$4d\ ^2P_2$	$2s^2\ 2p^2(^3P)4d$	$4d\ ^2P$	1½	441159	−225
$^2P_1$			½	441384	
$4d\ ^4P_3$	$2s^2\ 2p^2(^3P)4d$	$4d\ ^4P$	2½	442153	−147
$^4P_2$			1½	442300	−78
$^4P_1$			½	442378	
$4d\ ^2F_3$	$2s^2\ 2p^2(^3P)4d$	$4d\ ^2F$	2½	442280	354
$^2F_4$			3½	442634	
$\overline{\overline{3d}}\ ^2D_{23}$	$2s^2\ 2p^2(^1S)3d$	$3d''\ ^2D$	{1½, 2½}	442760	
$4d\ ^2D_2$	$2s^2\ 2p^2(^3P)4d$	$4d\ ^2D$	1½	444960	48
$^2D_3$			2½	445008	
$3d'\ ^6D_5$	$2s\ 2p^3(^5S^\circ)3d$	$3d'''\ ^6D^\circ$	4½	*462930.1* $+x$	−2.6
$^6D_4$			3½	*462932.7* $+x$	−3.8
$^6D_3$			2½	*462936.5* $+x$	−3.4
$^6D_2$			1½	*462939.9* $+x$	−2.5
$^6D_1$			½	*462942.4* $+x$	
$5d\ ^4P_3$	$2s^2\ 2p^2(^3P)5d$	$5d\ ^4P$	2½	465409	−132
$^4P_{12}$			{1½, ½}	465541	
$5d\ ^2D_{23}$	$2s^2\ 2p^2(^3P)5d$	$5d\ ^2D$	{1½, 2½}	466293	
$\overline{4d}\ ^2F_{34}$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2F$	{3½, 2½}	466810	
$\overline{4d}\ ^2D_{23}$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2D$	{1½, 2½}	466964	
$\overline{4d}\ ^2P_{12}$	$2s^2\ 2p^2(^1D)4d$	$4d'\ ^2P$	{½, 1½}	467798	
$3d'\ ^4D_4$	$2s\ 2p^3(^5S^\circ)3d$	$3d'''\ ^4D^\circ$	3½	*467868.9*	−0.4
$^4D_3$			2½	*467869.3*	−1.0
$^4D_{12}$			{1½, ½}	*467870.3*	
$\overline{3s'}\ ^2D_3$	$2s\ 2p^3(^3D^\circ)3s$	$3s^{IV}\ ^2D^\circ$	2½	*474369*	−44
$^2D_2$			1½	*474413*	
$\overline{5d}\ ^2F_{34}$	$2s^2\ 2p^2(^1D)5d$	$5d'\ ^2F$	{3½, 2½}	489494	
$\overline{5d}\ ^2D_{23}$	$2s^2\ 2p^2(^1D)5d$	$5d'\ ^2D$	{1½, 2½}	490140	
	F IV($^3P_0$)	*Limit*	------	***505410***	

January 1947.

F III Observed Terms*

Config. $1s^2+$	Observed Terms
$2s^2\,2p^3$	$2p^3\ {}^4S^\circ$ $2p^3\ {}^2P^\circ$ $2p^3\ {}^2D^\circ$
$2s\,2p^4$	$2p^4\ {}^4P$ $2p^4\ {}^2S$ $2p^4\ {}^2P$ $2p^4\ {}^2D$
$2p^5$	$2p^5\ {}^2P^\circ$

Config. $1s^2+$	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$
$2s^2\,2p^2(^3P)nx$	$3, 4s\ {}^4P$ $3, 4s\ {}^2P$	$3p\ {}^4S^\circ$ $3, 4p\ {}^4P^\circ$ $3, 4p\ {}^4D^\circ$ $3, 4p\ {}^2S^\circ$ $3, 4p\ {}^2P^\circ$ $3, 4p\ {}^2D^\circ$	$3\text{–}5d\ {}^4P$ $3d\ {}^4D$ $3d\ {}^4F$ $3, 4d\ {}^2P$ $3\text{–}5d\ {}^2D$ $3, 4d\ {}^2F$
$2s^2\,2p^2(^1D)nx'$	$3, 4s'\ {}^2D$	$3p'\ {}^2P^\circ$ $3p'\ {}^2D^\circ$ $3p'\ {}^2F^\circ$	$3d'\ {}^2S$ $3, 4d'\ {}^2P$ $3\text{–}5d'\ {}^2D$ $3\text{–}5d'\ {}^2F$ $3d'\ {}^2G$
$2s^2\,2p^2(^1S)nx''$	$3s''\ {}^2S$	$3p''\ {}^2P^\circ$	$3d''\ {}^2D$
$2s\,2p^3(^5S^\circ)nx'''$	$3s'''\ {}^6S^\circ$ $3s'''\ {}^4S^\circ$	$3p'''\ {}^6P$ $3p'''\ {}^4P$	$3d'''\ {}^6D^\circ$ $3d'''\ {}^4D^\circ$
$2s\,2p^3(^3D^\circ)nx^{IV}$	$3s^{IV}\ {}^2D^\circ$		

*For predicted terms in the spectra of the N I isoelectronic sequence, see Introduction.

F IV

(C I sequence; 6 electrons) $Z=9$

Ground state $1s^2\,2s^2\,2p^2\ {}^3P_0$

$2p^2\ {}^3P_0$ **703766.4 cm^{-1}** **I. P. 87.23 volts**

The first work on this spectrum was by Bowen. Edlén has greatly extended the earlier analysis. About 250 lines in the intervals 140 to 679 A and 2171 to 3176 A are now classified. The terms are from Edlén, who has rejected two terms in his published list, $4d'\ {}^3S$ and $\overline{\overline{3s}}'\ {}^3S$. Extrapolated values are entered in brackets in the table.

The singlet and triplet terms are connected by intersystem combinations. No such combinations involving quintet terms have been observed. The uncertainty x may reach 50 to 100 cm^{-1}.

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B. Edlén, Zeit. Phys. **92**, 19 (1934). (I P) (T) (C L)

B. Edlén, private communication (Dec. 1947). (T)

F IV

Edlén	Config.	Desig.	J	Level	Interval
$2p\ {}^3P_0$	$2s^2\ 2p^2$	$2p^2\ {}^3P$	0	0. 0	225. 2
${}^3P_1$			1	225. 2	388. 2
${}^3P_2$			2	613. 4	
$2p\ {}^1D_2$	$2s^2\ 2p^2$	$2p^2\ {}^1D$	2	25241	
$2p\ {}^1S_0$	$2s^2\ 2p^2$	$2p^2\ {}^1S$	0	53544	
$2p'\ {}^5S_2$	$2s\ 2p^3$	$2p^3\ {}^5S^\circ$	2	*74506* $+x$	
$2p'\ {}^3D_3$	$2s\ 2p^3$	$2p^3\ {}^3D^\circ$	3	*147841. 8*	−47. 1
${}^3D_2$			2	*147888. 9*	−12. 7
${}^3D_1$			1	*147901. 6*	
$2p'\ {}^3P_2$	$2s\ 2p^3$	$2p^3\ {}^3P^\circ$	2	*175237. 0*	−5. 0
${}^3P_1$			1	*175242. 0*	−22. 1
${}^3P_0$			0	*175264. 1*	
$2p'\ {}^1D_2$	$2s\ 2p^3$	$2p^3\ {}^1D^\circ$	2	*228908*	
$2p'\ {}^3S_1$	$2s\ 2p^3$	$2p^3\ {}^3S^\circ$	1	*238297. 2*	
$2p'\ {}^1P_1$	$2s\ 2p^3$	$2p^3\ {}^1P^\circ$	1	*257390*	
$2p''\ {}^3P_2$	$2p^4$	$2p^4\ {}^3P$	2	348327. 0	−443. 0
${}^3P_1$			1	348770. 0	−193. 0
${}^3P_0$			0	348963. 0	
$3s\ {}^3P_0$	$2s^2\ 2p(^2P^\circ)3s$	$3s\ {}^3P^\circ$	0	*416417. 3*	222. 5
${}^3P_1$			1	*416639. 8*	503. 6
${}^3P_2$			2	*417143. 4*	
$3s\ {}^1P_1$	$2s^2\ 2p(^2P^\circ)3s$	$3s\ {}^1P^\circ$	1	*423606. 4*	
$3p\ {}^3D_1$	$2s^2\ 2p(^2P^\circ)3p$	$3p\ {}^3D$	1	451819. 6	261. 5
${}^3D_2$			2	452081. 1	436. 0
${}^3D_3$			3	452517. 1	
$3p\ {}^3S_1$	$2s^2\ 2p(^2P^\circ)3p$	$3p\ {}^3S$	1	456884. 3	
$3p\ {}^3P_0$	$2s^2\ 2p(^2P^\circ)3p$	$3p\ {}^3P$	0	460215. 2	170. 6
${}^3P_1$			1	460385. 8	254. 8
${}^3P_2$			2	460640. 6	
$3p\ {}^1D_2$	$2s^2\ 2p(^2P^\circ)3p$	$3p\ {}^1D$	2	469644. 2	
$3d\ {}^3F_2$	$2s^2\ 2p(^2P^\circ)3d$	$3d\ {}^3F^\circ$	2	*492395. 1*	463. 7
${}^3F_3$			3	*492858. 8*	347. 4
${}^3F_4$			4	*493206. 2*	
$3d\ {}^1D_2$	$2s^2\ 2p(^2P^\circ)3d$	$3d\ {}^1D^\circ$	2	*492864*	
$3d\ {}^3D_1$	$2s^2\ 2p(^2P^\circ)3d$	$3d\ {}^3D^\circ$	1	*497481. 4*	94. 2
${}^3D_2$			2	*497575. 6*	153. 5
${}^3D_3$			3	*497729. 1*	
$3d\ {}^3P_2$	$2s^2\ 2p(^2P^\circ)3d$	$3d\ {}^3P^\circ$	2	*500390. 1*	−212. 0
${}^3P_1$			1	*500602. 1*	−114. 4
${}^3P_0$			0	*500716. 5*	
$3s'\ {}^5P_1$	$2s\ 2p^2(^4P)3s$	$3s\ {}^5P$	1	502723. 0$+x$	241. 4
${}^5P_2$			2	502964. 4$+x$	318. 0
${}^5P_3$			3	503282. 4$+x$	
$3d\ {}^1F_3$	$2s^2\ 2p(^2P^\circ)3d$	$3d\ {}^1F^\circ$	3	*505421. 4*	
$3d\ {}^1P_1$	$2s^2\ 2p(^2P^\circ)3d$	$3d\ {}^1P^\circ$	1	*506514*	
$3s'\ {}^3P_0$	$2s\ 2p^2(^4P)3s$	$3s\ {}^3P$	0	519341	198
${}^3P_1$			1	519539	351
${}^3P_2$			2	519890	
$3p'\ {}^3S_1$	$2s\ 2p^2(^4P)3p$	$3p\ {}^3S^\circ$	1	*534686*	
$3p'\ {}^5D_0$	$2s\ 2p^2(^4P)3p$	$3p\ {}^5D^\circ$	0	[*538507*] $+x$	[66]
${}^5D_1$			1	*538573. 3*$+x$	135. 9
${}^5D_2$			2	*538709. 2*$+x$	200. 6
${}^5D_3$			3	*538909. 8*$+x$	256. 3
${}^5D_4$			4	*539166. 1*$+x$	

F IV

Edlén	Config.	Desig.	J	Level	Interval
$3p'\ {}^5P_1$	$2s\ 2p^2(^4P)3p$	$3p\ {}^5P^\circ$	1	*542578. 3*$+x$	114. 9
${}^5P_2$			2	*542693. 2*$+x$	202. 0
${}^5P_3$			3	*542895. 2*$+x$	
$3p'\ {}^3D_1$	$2s\ 2p^2(^4P)3p$	$3p\ {}^3D^\circ$	1	*550918*	180
${}^3D_2$			2	*551098*	268
${}^3D_3$			3	*551366*	
	$2s\ 2p^2(^4P)3p$	$3p\ {}^3P^\circ$	0		
$3p'\ {}^3P_1$			1	*556051*	265
${}^3P_2$			2	*556316*	
$4s\ {}^3P_0$	$2s^2\ 2p(^2P^\circ)4s$	$4s\ {}^3P^\circ$	0	*559747*	134
${}^3P_1$			1	*559881*	423
${}^3P_2$			2	*560304*	
$4s\ {}^1P_1$	$2s^2\ 2p(^2P^\circ)4s$	$4s\ {}^1P^\circ$	1	*561267*	
$\overline{3s}'\ {}^3D_1$	$2s\ 2p^2(^2D)3s$	$3s'\ {}^3D$	1	567900	119
${}^3D_2$			2	568019	156
${}^3D_3$			3	568175	
$3d'\ {}^5F_1$	$2s\ 2p^2(^4P)3d$	$3d\ {}^5F$	1	[576581] $+x$	[75]
${}^5F_2$			2	576656. 1$+x$	112. 1
${}^5F_3$			3	576768. 2$+x$	148. 4
${}^5F_4$			4	576916. 6$+x$	183. 5
${}^5F_5$			5	577100. 1$+x$	
$3d'\ {}^5D_0$	$2s\ 2p^2(^4P)3d$	$3d\ {}^5D$	0	581806. 1$+x$	5. 4
${}^5D_1$			1	581811. 5$+x$	17. 1
${}^5D_2$			2	581828. 6$+x$	43. 7
${}^5D_3$			3	581872. 3$+x$	105. 3
${}^5D_4$			4	581977. 6$+x$	
$3d'\ {}^5P_3$	$2s\ 2p^2(^4P)3d$	$3d\ {}^5P$	3	583547 $+x$	−150
${}^5P_2$			2	583697 $+x$	−101
${}^5P_1$			1	583798 $+x$	
$3d'\ {}^3P_2$	$2s\ 2p^2(^4P)3d$	$3d\ {}^3P$	2	585201	−224
${}^3P_1$			1	585425	−106
${}^3P_0$			0	585531	
$\overline{3s}'\ {}^1D_2$	$2s\ 2p^2(^2D)3s$	$3s'\ {}^1D$	2	586263	
$4d\ {}^3F_2$	$2s^2\ 2p(^2P^\circ)4d$	$4d\ {}^3F^\circ$	2	*586641*	
			3		
			4		
$4d\ {}^1D_2$	$2s^2\ 2p(^2P^\circ)4d$	$4d\ {}^1D^\circ$	2	*587130*	
$3d'\ {}^3F_2$	$2s\ 2p^2(^4P)3d$	$3d\ {}^3F$	2	588021	202
${}^3F_3$			3	588223	255
${}^3F_4$			4	588478	
$4d\ {}^3D_1$	$2s^2\ 2p(^2P^\circ)4d$	$4d\ {}^3D^\circ$	1	*589109*	79
${}^3D_2$			2	*589188*	218
${}^3D_3$			3	*589406*	
$4d\ {}^3P_2$	$2s^2\ 2p(^2P^\circ)4d$	$4d\ {}^3P^\circ$	2	*590024*	−177
${}^3P_1$			1	*590201*	−61
${}^3P_0$			0	*590262*	
$4d\ {}^1F_3$	$2s^2\ 2p(^2P^\circ)4d$	$4d\ {}^1F^\circ$	3	*592240*	
$4d\ {}^1P_1$	$2s^2\ 2p(^2P^\circ)4d$	$4d\ {}^1P^\circ$	1	*592674*	
$3d'\ {}^3D_1$	$2s\ 2p^2(^4P)3d$	$3d\ {}^3D$	1	595331	72
${}^3D_2$			2	595403	78
${}^3D_3$			3	595481	
$\overline{3p}'\ {}^1F_3$	$2s\ 2p^2(^2D)3p$	$3p'\ {}^1F^\circ$	3	*609811*	
$\overline{3p}'\ {}^1D_2$	$2s\ 2p^2(^2D)3p$	$3p'\ {}^1D^\circ$	2	*612830*	
$\overline{3p}'\ {}^1P_1$	$2s\ 2p^2(^2D)3p$	$3p'\ {}^1P^\circ$	1	*618889*	
$5d\ {}^3F_2$	$2s^2\ 2p(^2P^\circ)5d$	$5d\ {}^3F^\circ$	2	*629547*	
			3		
			4		

F IV—Continued

Edlén	Config.	Desig.	J	Level	Interval
$5d\ ^1D_2$	$2s^2\ 2p(^2P^\circ)5d$	$5d\ ^1D^\circ$	2	*630019*	
	$2s^2\ 2p(^2P^\circ)5d$	$5d\ ^3D^\circ$	1		
			2		
$5d\ ^3D_3$			3	*631126*	
$5d\ ^3P_2$	$2s^2\ 2p(^2P^\circ)5d$	$5d\ ^3P^\circ$	2	[*631426*]	[−120]
$^3P_{01}$			1, 0	*631546*	
$5d\ ^1F_3$	$2s^2\ 2p(^2P^\circ)5d$	$5d\ ^1F^\circ$	3	*632730*	
$5d\ ^1P_1$	$2s^2\ 2p(^2P^\circ)5d$	$5d\ ^1P^\circ$	1	*632740*	
$\overline{3d'}\ ^3F_{234}$	$2s\ 2p^2(^2D)3d$	$3d'\ ^3F$	2, 3, 4	644224	
	$2s\ 2p^2(^4P)4s$	$4s\ ^5P$	1		
$4s'\ ^5P_2$			2	645504 +x	323
$^5P_3$			3	645827 +x	
	$2s\ 2p^2(^2D)3d$	$3d'\ ^3P$	0		
			1		
$\overline{3d'}\ ^3P_2$			2	648827	
$\overline{3d'}\ ^3D_{12}$	$2s\ 2p^2(^2D)3d$	$3d'\ ^3D$	1, 2	650196	146
$^3D_3$			3	650342	
	$2s^2\ 2p(^2P^\circ)6d$	$6d\ ^3D^\circ$	1		
			2		
$6d\ ^3D_3$			3	*653606*	
$6d\ ^3P_2$	$2s^2\ 2p(^2P^\circ)6d$	$6d\ ^3P^\circ$	2	*653772*	−61
$^3P_{01}$			1, 0	*653833*	
$6d\ ^1F_3$	$2s^2\ 2p(^2P^\circ)6d$	$6d\ ^1F^\circ$	3	*654469*	
$\overline{3d'}\ ^3S_1$	$2s\ 2p^2(^2D)3d$	$3d'\ ^3S$	1	654739	

F IV—Continued

Edlén	Config.	Desig.	J	Level	Interval
$\overline{3d'}\ ^1F_3$	$2s\ 2p^2(^2D)3d$	$3d'\ ^1F$	3	657546	
$\overline{3d'}\ ^1D_2$	$2s\ 2p^2(^2D)3d$	$3d'\ ^1D$	2	657800	
$\overline{3d'}\ ^1P_1$	$2s\ 2p^2(^2D)3d$	$3d'\ ^1P$	1	658629	
	$2s\ 2p^2(^4P)4p$	$4p\ ^3D^\circ$	1		
			2		
$4p'\ ^3D_3$			3	*662843*	
	$2s\ 2p^2(^4P)4p$	$4p\ ^3P^\circ$	0		
			1		
$4p'\ ^3P_2$			2	*665409*	
$4d'\ ^5P_3$	$2s\ 2p^2(^4P)4d$	$4d\ ^5P$	3	675110 +x	−199
$^5P_{12}$			2, 1	675309 +x	
$4d'\ ^3F_2$	$2s\ 2p^2(^4P)4d$	$4d\ ^3F$	2	677467	200
$^3F_3$			3	677667	239
$^3F_4$			4	677906	
$4d'\ ^3D_3$	$2s\ 2p^2(^4P)4d$	$4d\ ^3D$	1, 2	679798	196
$^3D_{12}$			3	679994	
	F v $(^2P^\circ_{1/2})$	*Limit*	------	**703766.4**	
	$2s\ 2p^2(^4P)5p$	$5p\ ^3D^\circ$	1		
			2		
$5p'\ ^3D_3$			3	*710760*	
$5d'\ ^5P_3$	$2s\ 2p^2(^4P)5d$	$5d\ ^5P$	3	716878 +x	−202
$^5P_{12}$			2, 1	717080 +x	
$\overline{4d'}\ ^3F_{234}$	$2s\ 2p^2(^2D)4d$	$4d'\ ^3F$	2, 3, 4	738996	

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F IV Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2\ 2p^2$	$2p^2\ ^3P$; $2p^2\ ^1S$; $2p^2\ ^1D$		
$2s\ 2p^3$	$2p^3\ ^5S^\circ$; $2p^3\ ^3S^\circ$; $2p^3\ ^3P^\circ$; $2p^3\ ^1P^\circ$; $2p^3\ ^3D^\circ$; $2p^3\ ^1D^\circ$		
$2p^4$	$2p^4\ ^3P$		
	$ns\ (n\geq 3)$	$np\ (n\geq 3)$	$nd\ (n\geq 3)$
$2s^2\ 2p(^2P^\circ)nx$	3, $4s\ ^3P^\circ$; 3, $4s\ ^1P^\circ$	$3p\ ^3S$; $3p\ ^3P$; $3p\ ^3D$; $3p\ ^1D$	3–$6d\ ^3P^\circ$; 3–$5d\ ^1P^\circ$; 3–$6d\ ^3D^\circ$; 3–$5d\ ^1D^\circ$; 3–$5d\ ^3F^\circ$; 3–$6d\ ^1F^\circ$
$2s\ 2p^2(^4P)nx$	3, $4s\ ^5P$; $3s\ ^3P$	$3p\ ^3S^\circ$; $3p\ ^5P^\circ$; 3, $4p\ ^3P^\circ$; $3p\ ^5D^\circ$; 3–$5p\ ^3D^\circ$	3–$5d\ ^5P$; $3d\ ^3P$; $3d\ ^5D$; 3, $4d\ ^3D$; $3d\ ^5F$; 3, $4d\ ^3F$
$2s\ 2p^2(^2D)nx'$	$3s'\ ^3D$; $3s'\ ^1D$	$3p'\ ^1P^\circ$; $3p'\ ^1D^\circ$; $3p'\ ^1F^\circ$	$3d'\ ^3S$; $3d'\ ^3P$; $3d'\ ^1P$; $3d'\ ^3D$; $3d'\ ^1D$; 3, $4d'\ ^3F$; $3d'\ ^1F$

*For predicted terms in the spectra of the C I isoelectronic sequence, see Introduction.

F V

(B I sequence; 5 electrons) $Z=9$

Ground state $1s^2\,2s^2\,2p\ {}^2P^{\circ}_{1/2}$

$2p\ {}^2P^{\circ}_{1/2}$ ***921450*** cm^{-1} I. P. 114.214 volts

All of the terms are from an unpublished manuscript kindly furnished by Edlén. He has revised and extended his earlier analysis. The notation in the left column is from his published papers.

No intersystem combinations have been observed. The position of the quartet terms relative to the doublets may be in error by ± 100 cm^{-1} according to Edlén. This uncertainty is indicated by x in the table.

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B. Edlén, unpublished material (Dec. 1947). (I P) (T).

F V

Edlén	Config.	Desig.	J	Level	Interval
$2p\ {}^2P_1$ ${}^2P_2$	$2s^2({}^1S)2p$	$2p\ {}^2P^{\circ}$	½ 1½	*0* *746*	746
$2p'\ {}^4P_1$ ${}^4P_2$ ${}^4P_3$	$2s\ 2p^2$	$2p^2\ {}^4P$	½ 1½ 2½	86035+x 86287+x 86651+x	252 364
$2p'\ {}^2D_3$ ${}^2D_2$	$2s\ 2p^2$	$2p^2\ {}^2D$	2½ 1½	152876 152898	−22
$2p'\ {}^2S_1$	$2s\ 2p^2$	$2p^2\ {}^2S$	½	197565	
$2p'\ {}^2P_1$ ${}^2P_2$	$2s\ 2p^2$	$2p^2\ {}^2P$	½ 1½	214881 215348	467
$2p''\ {}^4S_2$	$2p^3$	$2p^3\ {}^4S^{\circ}$	1½	*276657*+x	
$2p''\ {}^2D_3$ ${}^2D_2$	$2p^3$	$2p^3\ {}^2D^{\circ}$	2½ 1½	*307226* *307273*	−47
$2p''\ {}^2P_1$ ${}^2P_2$	$2p^3$	$2p^3\ {}^2P^{\circ}$	½ 1½	*347418* *347438*	20
$3s\ {}^2S_1$	$2s^2({}^1S)3s$	$3s\ {}^2S$	½	524751	
$3p\ {}^2P_1$ ${}^2P_2$	$2s^2({}^1S)3p$	$3p\ {}^2P^{\circ}$	½ 1½	*565367* *565544*	177
$3d\ {}^2D_2$ ${}^2D_3$	$2s^2({}^1S)3d$	$3d\ {}^2D$	1½ 2½	602476 602516	40
$3s'\ {}^4P_1$ ${}^4P_2$ ${}^4P_3$	$2s\ 2p({}^3P^{\circ})3s$	$3s\ {}^4P^{\circ}$	½ 1½ 2½	*621138*+x *621395*+x *621863*+x	257 468
$3s'\ {}^2P_1$ ${}^2P_2$	$2s\ 2p({}^3P^{\circ})3s$	$3s\ {}^2P^{\circ}$	½ 1½	*638856* *639365*	509
$3p'\ {}^2P_1$ ${}^2P_2$	$2s\ 2p({}^3P^{\circ})3p$	$3p\ {}^2P$	½ 1½	656208 656436	228
$3p'\ {}^4D_1$ ${}^4D_2$ ${}^4D_3$ ${}^4D_4$	$2s\ 2p({}^3P^{\circ})3p$	$3p\ {}^4D$	½ 1½ 2½ 3½	657988+x 658134+x 658390+x 658791+x	146 256 401
$3p'\ {}^4S_2$	$2s\ 2p({}^3P^{\circ})3p$	$3p\ {}^4S$	1½	666240+x	
$3p'\ {}^2D_2$ ${}^2D_3$	$2s\ 2p({}^3P^{\circ})3p$	$3p\ {}^2D$	1½ 2½	675932 676422	490
$3p'\ {}^2S_1$	$2s\ 2p({}^3P^{\circ})3p$	$3p\ {}^2S$	½	687806	
$3d'\ {}^4D_{12}$ ${}^4D_3$ ${}^4D_4$	$2s\ 2p({}^3P^{\circ})3d$	$3d\ {}^4D^{\circ}$	{½, 1½} 2½ 3½	*697817*+x *697919*+x *698055*+x	102 136
$3d'\ {}^2D_2$ ${}^2D_3$	$2s\ 2p({}^3P^{\circ})3d$	$3d\ {}^2D^{\circ}$	1½ 2½	*699293* *699389*	96
$3d'\ {}^4P_3$ ${}^4P_2$ ${}^4P_1$	$2s\ 2p({}^3P^{\circ})3d$	$3d\ {}^4P^{\circ}$	2½ 1½ ½	*702908*+x *703117*+x *703259*+x	−209 −142
$\overline{3s'}\ {}^2P_{12}$	$2s\ 2p({}^1P^{\circ})3s$	$3s'\ {}^2P^{\circ}$	{½, 1½}	*712755*	

F V—Continued

Edlén	Config.	Desig.	J	Level	Interval
$3d'\ ^2F_3$ $^2F_4$	$2s\ 2p(^3P^\circ)3d$	$3d\ ^2F^\circ$	2½ 3½	*712840* *713306*	466
$4s\ ^2S_1$	$2s^2(^1S)4s$	$4s\ ^2S$	½	712936	
$3d'\ ^2P_2$ $^2P_1$	$2s\ 2p(^3P^\circ)3d$	$3d\ ^2P^\circ$	1½ ½	*718472* *718691*	−219
$4d\ ^2D_2$ $^2D_3$	$2s^2(^1S)4d$	$4d\ ^2D$	1½ 2½	744010 744036	26
$\overline{3p}'\ ^2D_2$ $^2D_3$	$2s\ 2p(^1P^\circ)3p$	$3p'\ ^2D$	1½ 2½	751406 751452	46
$\overline{3p}'\ ^2P_1$ $^2P_2$	$2s\ 2p(^1P^\circ)3p$	$3p'\ ^2P$	½ 1½	752529 753656	127
$\overline{3p}'\ ^2S_1$	$2s\ 2p(^1P^\circ)3p$	$3p'\ ^2S$	½	760342	
$\overline{3d}'\ ^2F_{34}$	$2s\ 2p(^1P^\circ)3d$	$3d'\ ^2F^\circ$	{2½ 3½}	*783650*	
$3s''\ ^4P_1$ $^4P_2$ $^4P_3$	$2p^2(^3P)3s$	$3s''\ ^4P$	½ 1½ 2½	784343+x 784604+x 785014+x	261 410
$\overline{3d}'\ ^2D_2$ $^2D_3$	$2s\ 2p(^1P^\circ)3d$	$3d'\ ^2D^\circ$	1½ 2½	*787725* *787764*	39
$\overline{3d}'\ ^2P_{12}$	$2s\ 2p(^1P^\circ)3d$	$3d'\ ^2P^\circ$	{½ 1½}	*793308*	
$3s''\ ^2P_1$ $^2P_2$	$2p^2(^3P)3s$	$3s''\ ^2P$	½ 1½	797059 797519	460
 $5d\ ^2D_3$	$2s^2(^1S)5d$	$5d\ ^2D$	1½ 2½	808663 808677	14
  $4s'\ ^4P_3$	$2s\ 2p(^3P^\circ)4s$	$4s\ ^4P^\circ$	½ 1½ 2½	 *810298+x*	
$\overline{3s}'''\ ^2D$	$2p^2(^1D)3s$	$3s'''\ ^2D$	{1½ 2½}	811075	
   $3p''\ ^4D_4$	$2p^2(^3P)3p$	$3p''\ ^4D^\circ$	½ 1½ 2½ 3½	 *816518+x* *816759+x* *817101+x*	241 342
  $3p''\ ^4P_3$	$2p^2(^3P)3p$	$3p''\ ^4P^\circ$	½ 1½ 2½	 *823375+x* *823625+x*	250
	$2s\ 2p(^3P^\circ)4p$	$4p\ ^2P$	½ 1½	829436 829707	271
$4p'\ ^2D_2$ $^2D_3$	$2s\ 2p(^3P^\circ)4p$	$4p\ ^2D$	1½ 2½	833501 833920	419
$3p''\ ^4S_2$	$2p^2(^3P)3p$	$3p''\ ^4S^\circ$	1½	*834790+x*	
	$2s\ 2p(^3P^\circ)4p$	$4p\ ^2S$	½	838036	
   $4d'\ ^4D_4$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^4D^\circ$	{½ 1½} 2½ 3½	*841037+x* *841095+x* *841305+x*	58 210

F V—Continued

Eglén	Config.	Desig.	J	Level	Interval
	$2s\ 2p(^3P^\circ)4d$	$4d\ ^2D^\circ$	1½ 2½	*841598* *841695*	97
$4d'\ ^4P_3$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^4P^\circ$	2½ 1½ ½	*842452+x*	
	$2s^2(^1S)6d$	$6d\ ^2D$	1½ 2½	 843497	
$\overline{3p}''\ ^2F_3$ $^2F_4$	$2p^2(^1D)3p$	$3p'''\ ^2F^\circ$	2½ 3½	*844112* *844266*	154
$4d'\ ^2F_3$ $^2F_4$	$2s\ 2p(^3P^\circ)4d$	$4d\ ^2F^\circ$	2½ 3½	*847506* *847817*	311
	$2p^2(^3P)3d$	$3d''\ ^2P$	1½ ½	853035 853442	−407
	$2p^2(^1D)3p$	$3p'''\ ^2D^\circ$	1½ 2½	*854971*	
$3d''\ ^4P_3$ $^4P_2$ $^4P_1$	$2p^2(^3P)3d$	$3d''\ ^4P$	2½ 1½ ½	860421+x 860619+x 860725+x	−198 −106
$\overline{3d}''\ ^2D$	$2p^2(^1D)3d$	$3d'''\ ^2D$	{1½ 2½}	873904	
$\overline{3d}''\ ^2F_{34}$	$2p^2(^1D)3d$	$3d'''\ ^2F$	{2½ 3½}	880312	
$\overline{3d}''\ ^2P_1$ $^2P_2$	$2p^2(^1D)3d$	$3d'''\ ^2P$	½ 1½	882930 883083	153
	$2s\ 2p(^3P^\circ)5s$	$5s\ ^4P^\circ$	½ 1½ 2½	 *892180+x*	
	$2s\ 2p(^3P^\circ)5p$	$5p\ ^2D$	1½ 2½	901487 902012	525
  $5d'\ ^4D$	$2s\ 2p(^3P^\circ)5d$	$5d\ ^4D^\circ$	½ 1½ 2½ 3½	 *906074+x*	
	$2s\ 2p(^3P^\circ)5d$	$5d\ ^4P^\circ$	2½ 1½ ½	*906565+x*	
	F VI ($^1S_0$)	*Limit*	------	***921450***	
	$2s\ 2p(^3P^\circ)6d$	$6d\ ^4D^\circ$	½ 1½ 2½ 3½	 *940921+x*	
	$2s\ 2p(^3P^\circ)6d$	$6d\ ^4P^\circ$	2½ 1½ ½	*941286+x*	
	$2p^2(^3P)4d$	$4d''\ ^4P$	2½ 1½ ½	998189+x	

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F v Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2(^1S)2p$	$2p\ ^2P^\circ$		
$2s\ 2p^2$	$2p^2\ ^4P$; $2p^2\ ^2S$, $2p^2\ ^2P$, $2p^2\ ^2D$		
$2p^3$	$2p^3\ ^4S^\circ$; $2p^3\ ^2P^\circ$, $2p^3\ ^2D^\circ$		
	$ns\ (n\geq3)$	$np\ (n\geq3)$	$nd\ (n\geq3)$
$2s^2(^1S)nx$	$3, 4s\ ^2S$	$3p\ ^2P^\circ$	$3\text{–}6d\ ^2D$
$2s\ 2p(^3P^\circ)nx$	$3\text{–}5s\ ^4P^\circ$; $3s\ ^2P^\circ$	$3p\ ^4S$, $3p\ ^4D$; $3, 4p\ ^2S$, $3, 4p\ ^2P$, $3\text{–}5p\ ^2D$	$3\text{–}6d\ ^4P^\circ$, $3\text{–}6d\ ^4D^\circ$; $3d\ ^2P^\circ$, $3, 4d\ ^2D^\circ$, $3, 4d\ ^2F^\circ$
$2s\ 2p(^1P^\circ)nx'$	$3s'\ ^2P^\circ$	$3p'\ ^2S$, $3p'\ ^2P$, $3p'\ ^2D$	$3d'\ ^2P^\circ$, $3d'\ ^2D^\circ$, $3d'\ ^2F^\circ$
$2p^2(^3P)nx''$	$3s''\ ^4P$; $3s''\ ^2P$	$3p''\ ^4S^\circ$, $3p''\ ^4P^\circ$, $3p''\ ^4D^\circ$	$3, 4d''\ ^4P$; $3d''\ ^2P$
$2p^2(^1D)nx'''$	$3s'''\ ^2D$	$3p'''\ ^2D^\circ$, $3p'''\ ^2F^\circ$	$3d'''\ ^2P$, $3d'''\ ^2D$, $3d'''\ ^2F$

*For predicted terms in the spectra of the B I isoelectronic sequence, see Introduction.

F VI

(Be I sequence; 4 electrons) $Z=9$

Ground state $1s^2 2s^2\ ^1S_0$

$2s^2\ ^1S_0$ **1267581 cm⁻¹** **I. P. 157.117 volts**

Edlén has revised and extended his published analysis and has generously furnished a manuscript copy of his complete term li[illegible]vance of publication, for inclusion here.

In the published papers he has use[illegible]me to designate the terms from the $^2P^\circ$ limit in F VII.

Intersystem combinations connecting the singlet and triplet systems of terms, have been observed.

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F VI

Config.	Desig.	J	Level	Interval
$2s^2$	$2s^2\ {}^1S$	0	0	
$2s(^2S)2p$	$2p\ {}^3P^\circ$	0 1 2	*96601* *96861* *97437*	260 576
$2s(^2S)2p$	$2p\ {}^1P^\circ$	1	*186841*	
$2p^2$	$2p^2\ {}^3P$	0 1 2	251341 251635 252145	294 510
$2p^2$	$2p^2\ {}^1D$	2	274597	
$2p^2$	$2p^2\ {}^1S$	0	340424	
$2s(^2S)3s$	$3s\ {}^3S$	1	747298	
$2s(^2S)3s$	$3s\ {}^1S$	0	764392	
$2s(^2S)3p$	$3p\ {}^1P^\circ$	1	*787833*	
$2s(^2S)3p$	$3p\ {}^3P^\circ$	0 1 2	 *790326* *790474*	148
$2s(^2S)3d$	$3d\ {}^3D$	1, 2 3	812169 812208	39
$2s(^2S)3d$	$3d\ {}^1D$	2	826853	
$2p(^2P^\circ)3s$	$3s\ {}^3P^\circ$	0 1 2	*871160* *871441* *872078*	281 637
$2p(^2P^\circ)3s$	$3s\ {}^1P^\circ$	1	*884290*	
$2p(^2P^\circ)3p$	$3p\ {}^1P$	1	895287	
$2p(^2P^\circ)3p$	$3p\ {}^3D$	1 2 3	900442 900785 901397	343 612
$2p(^2P^\circ)3p$	$3p\ {}^3S$	1	909316	
$2p(^2P^\circ)3p$	$3p\ {}^3P$	0 1 2	915196 915420 915770	224 350
$2p(^2P^\circ)3d$	$3d\ {}^1D^\circ$	2	*921821*	
$2p(^2P^\circ)3p$	$3p\ {}^1D$	2	925393	
$2p(^2P^\circ)3d$	$3d\ {}^3D^\circ$	1 2 3	*933586* *933717* *933920*	131 203
$2p(^2P^\circ)3p$	$3p\ {}^1S$	0	934633	

F VI

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)3d$	$3d\ {}^3P^\circ$	2 1 0	*938524* *938811* *938958*	−287 −147
$2p(^2P^\circ)3d$	$3d\ {}^1F^\circ$	3	*947305*	
$2p(^2P^\circ)3d$	$3d\ {}^1P^\circ$	1	*953402*	
$2s(^2S)4s$	$4s\ {}^3S$	1	989928	
$2s(^2S)4s$	$4s\ {}^1S$	0	997693	
$2s(^2S)4p$	$4p\ {}^1P^\circ$	1	*1007852*	
$2s(^2S)4d$	$4d\ {}^3D$	1 2 3	 1014439	
$2s(^2S)4d$	$4d\ {}^1D$	2	1019363	
$2s(^2S)5s$	$5s\ {}^3S$	1	1093463	
$2s(^2S)5p$	$5p\ {}^1P^\circ$	1	*1099409*	
$2s(^2S)5d$	$5d\ {}^3D$	1 2 3	 1106417	
$2s(^2S)5d$	$5d\ {}^1D$	2	1108712	
$2p(^2P^\circ)4s$	$4s\ {}^1P^\circ$	1	*1112328*	
$2p(^2P^\circ)4p$	$4p\ {}^1P$	1	1115967	
$2p(^2P^\circ)4p$	$4p\ {}^3D$	1 2 3	1117498 1117741 1118273	243 532
$2p(^2P^\circ)4p$	$4p\ {}^3S$	1	1121377	
$2p(^2P^\circ)4p$	$4p\ {}^3P$	0 1 2	 1122468 1122662	194
$2p(^2P^\circ)4p$	$4p\ {}^1D$	2	1126152	
$2p(^2P^\circ)4d$	$4d\ {}^1D^\circ$	2	*1126168*	
$2p(^2P^\circ)4d$	$4d\ {}^3D^\circ$	1 2 3	 *1130339*	
$2p(^2P^\circ)4d$	$4d\ {}^3P^\circ$	2 1 0	*1131653* *1131857*	−204
$2p(^2P^\circ)4d$	$4d\ {}^1F^\circ$	3	*1135953*	
$2p(^2P^\circ)4d$	$4d\ {}^1P^\circ$	1	*1137535*	

F VI—Continued

Config.	Desig.	J	Level	Interval
$2s(^2S)6p$	$6p\ ^1P^\circ$	1	*1154428*	
$2s(^2S)6d$	$6d\ ^3D$	1		
		2		
		3	1156097	
$2s(^2S)6d$	$6d\ ^1D$	2	1157385	
$2s(^2S)7p$	$7p\ ^1P^\circ$	1	*1184469*	
$2s(^2S)7d$	$7d\ ^3D$	1		
		2		
		3	1185884	
$3s(^2S)7d$	$7d\ ^1D$	2	1186611	
$2s(^2S)8d$	$8d\ ^3D$	1		
		2		
		3	1205139	
$2p(^2P^\circ)5p$	$5p\ ^3D$	1		
		2		
		3	1215055	
$2p(^2P^\circ)5p$	$5p\ ^3P$	0		
		1		
		2	1216995	
$2p(^2P^\circ)5p$	$5p\ ^1D$	2	1218588	
$2p(^2P^\circ)5d$	$5d\ ^1D^\circ$	2	*1218786*	

F VI—Continued

Config.	Desig.	J	Level	Interval
$2p(^2P^\circ)5d$	$5d\ ^3D^\circ$	1		
		2		
		3	*1220940*	
$2p(^2P^\circ)5d$	$5d\ ^3P^\circ$	2	*1221541*	
		1		
		0		
$2p(^2P^\circ)5d$	$5d\ ^1F^\circ$	3	*1223598*	
$2p(^2P^\circ)5d$	$5d\ ^1P^\circ$	1	*1224285*	
$2p(^2P^\circ)6p$	$6p\ ^3D$	1		
		2		
		3	1266672	
F VII $(^2S_{1/2})$	***Limit***	--------	**1267581**	
$2p(^2P^\circ)6p$	$6p\ ^3P$	0		
		1		
		2	1267616	
$2p(^2P^\circ)6p$	$6p\ ^1D$	2	1268554	
$2p(^2P^\circ)6d$	$6d\ ^3D^\circ$	1		
		2		
		3	*1269888*	
$2p(^2P^\circ)6d$	$6d\ ^1F^\circ$	3	*1271437*	
$2p(^2P^\circ)7d$	$7d\ ^3D^\circ$	1		
		2		
		3	*1299418*	

December 1947.

F VI Observed Terms*

Config. $1s^2+$	Observed Terms		
$2s^2$	$2s^2\ ^1S$		
$2s(^2S)2p$	$2p\ ^3P^\circ$ $2p\ ^1P^\circ$		
$2p^2$	$2p^2\ ^1S$ $2p^2\ ^3P$ $2p^2\ ^1D$		
	ns $(n\geq3)$	np $(n\geq3)$	nd $(n\geq3)$
$2s(^2S)nx$	3–$5s\ ^3S$ $3, 4s\ ^1S$	$3p\ ^3P^\circ$ 3–$7p\ ^1P^\circ$	3–$8d\ ^3D$ 3–$7d\ ^1D$
$2p(^2P^\circ)nx$	$3s\ ^3P^\circ$ $3, 4s\ ^1P^\circ$	$3, 4p\ ^3S$ 3–$6p\ ^3P$ 3–$6p\ ^3D$ $3p\ ^1S$ $3, 4p\ ^1P$ 3–$6p\ ^1D$	3–$5d\ ^3P^\circ$ 3–$7d\ ^3D^\circ$ 3–$5d\ ^1P^\circ$ 3–$5d\ ^1D^\circ$ 3–$6d\ ^1F^\circ$

*For predicted terms in the spectra of the Be I isoelectronic sequence, see Introduction.

F VII

(Li I sequence; 3 electrons) $Z=9$

Ground state $1s^2\,2s\;{}^2\mathrm{S}_{1/2}$

$2s\;{}^2\mathrm{S}_{1/2}$ **1493656** cm^{-1} **I. P. 185.139 volts**

The analysis is by Edlén, who, in 1934, published a list of nine classified lines in the range between 86 A and 134 A. He has recently extended the analysis and has generously furnished his unpublished term list for use in the present compilation. All terms in the table have been taken from the later list, although the entries in column one are from the earlier paper.

Edlén remarks that the $np\;{}^2\mathrm{P}^\circ$ and $nd\;{}^2\mathrm{D}$ series have been observed in the vacuum spark further than indicated in the table, but beyond $n=6$ the term values calculated from a Ritz formula are probably to be preferred.

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F VII

Edlén	Config.	Desig.	J	Level	Interval
$2s\;{}^2\mathrm{S}$	$2s$	$2s\;{}^2\mathrm{S}$	½	0	
$2p\;{}^2\mathrm{P}_1$ ${}^2\mathrm{P}_2$	$2p$	$2p\;{}^2\mathrm{P}^\circ$	½ 1½	*112258* *113235*	977
$3s\;{}^2\mathrm{S}$	$3s$	$3s\;{}^2\mathrm{S}$	½	854625	
$3p\;{}^2\mathrm{P}_1$ ${}^2\mathrm{P}_2$	$3p$	$3p\;{}^2\mathrm{P}^\circ$	½ 1½	*885136* *885418*	282
$3d\;{}^2\mathrm{D}_2$ ${}^2\mathrm{D}_3$	$3d$	$3d\;{}^2\mathrm{D}$	1½ 2½	895632 895722	90
$4s\;{}^2\mathrm{S}$	$4s$	$4s\;{}^2\mathrm{S}$	½	1140416	
$4p\;{}^2\mathrm{P}_2$	$4p$	$4p\;{}^2\mathrm{P}^\circ$	{½, 1½}	*1152977*	
$4d\;{}^2\mathrm{D}_3$	$4d$	$4d\;{}^2\mathrm{D}$	1½ 2½	1157223 1157255	32
	$5s$	$5s\;{}^2\mathrm{S}$	½	1269826	
	$5p$	$5p\;{}^2\mathrm{P}^\circ$	{½, 1½}	*1276194*	
$5d\;{}^2\mathrm{D}_3$	$5d$	$5d\;{}^2\mathrm{D}$	{1½, 2½}	1278404	
	$6s$	$6s\;{}^2\mathrm{S}$	½	1339216	
	$6p$	$6p\;{}^2\mathrm{P}^\circ$	{½, 1½}	*1342877*	
	$6d$	$6d\;{}^2\mathrm{D}$	{1½, 2½}	1344141	
	$7s$	$7s\;{}^2\mathrm{S}$	½	1380775	
	$7p$	$7p\;{}^2\mathrm{P}^\circ$	{½, 1½}	*1382858*	
	$7d$	$7d\;{}^2\mathrm{D}$	{1½, 2½}	1383841	
	$8p$	$8p\;{}^2\mathrm{P}^\circ$	{½, 1½}	*1408848*	
	$8d$	$8d\;{}^2\mathrm{D}$	{1½, 2½}	1409538	
	F VIII (${}^1\mathrm{S}_0$)	*Limit*	------	**1493656**	

September 1947.

F VIII

(He I sequence; 2 electrons) **Z=9**

Ground state $1s^2\,{}^1S_0$

$1s^2\,{}^1S_0$ 7693400±800 cm^{-1} **I. P. 953.60±0.10 volts**

Flemberg has classified three lines between 13 A and 16 A as the first three members of the singlet series. Tyrén has also observed the first two members of this series and classified a line at 16.951 A as the intersystem combination $1s^2\,{}^1S_0-2p\,{}^3P^\circ_1$. Tyrén's value of the limit is quoted here. The unit, 10^3 cm^{-1}, has here been changed to cm^{-1}.

Edlén has extended the analysis and has generously furnished his unpublished manuscript containing absolute values of the triplet terms extrapolated along the He I isoelectronic sequence. The relative positions of the singlet and triplet terms thus determined confirm the intersystem combination reported by Tyrén. The $2s\,{}^3S-2p\,{}^3P^\circ$ combination has apparently not been observed, but Edlén regards the extrapolation from the irregular doublet law as very reliable. Brackets are used in the table to denote extrapolated values not yet confirmed by observation.

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F VIII

Config.	Desig.	J	Level	Interval
$1s^2$	$1s^2\,{}^1S$	0	0	
$1s\,2s$	$2s\,{}^3S$	1	[5829920]	
$1s\,2p$	$2p\,{}^3P^\circ$	0	[*5899150*]	[160]
		1	*5899310*	[950]
		2	[*5900260*]	
$1s\,2p$	$2p\,{}^1P^\circ$	1	*5949900*	

F VIII

Config.	Desig.	J	Level	Interval
$1s\,3d$	$3d\,{}^3D$	3, 2, 1	[6912360]	
$1s\,3p$	$3p\,{}^1P^\circ$	1	*6916590*	
$1s\,4p$	$4p\,{}^1P^\circ$	1	*7256680*	
F IX ($^2S_{1/2}$)	*Limit*		**7693400**	

September 1947.